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CHEMICAL SECURITY: ASSESSING PROGRESS AND CHARTING A PATH FORWARD

HEARING

BEFORE THE

COMMITTEE ON HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

MARCH 3, 2010

Available via the World Wide Web: http://www.fdsys.gov/

Printed for the use of the Committee on Homeland Security
and Governmental Affairs

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CHEMICAL SECURITY: ASSESSING PROGRESS AND CHARTING A PATH FORWARD

WEDNESDAY, MARCH 3, 2010

U.S. SENATE,
COMMITTEE ON HOMELAND SECURITY
AND GOVERNMENTAL AFFAIRS,
Washington, DC.

The Committee met, pursuant to notice, at 9:34 a.m., in room SD–342, Dirksen Senate Office Building, Hon. Joseph I. Lieberman, Chairman of the Committee, presiding.

Present: Senators Lieberman, Levin, Carper, Pryor, Collins, and Voinovich.

OPENING STATEMENT OF CHAIRMAN LIEBERMAN

Chairman LIEBERMAN. The hearing will come to order. One of our witnesses on the first panel is not here yet. Senator Collins and I will proceed with our opening statements, and the two witnesses, and I am sure that in short order Mr. Beers will be here.

We have called this hearing this morning to review the Federal Government's efforts to strengthen the security of hundreds of chemical sites around our country and to chart, if we can, a path forward to reduce the possibility that terrorists could take advantage of existing security vulnerabilities at these sites.

In the aftermath of September 11, 2001, all of us developed a new awareness of potential targets of terrorists in our homeland. Many quickly realized that some of our Nation's most robust and varied industries—while obviously a source of great economic strength and job creation—also inherently posed substantial security risks, if attacked. And that included the many facilities that produce or use hazardous chemicals that could be turned against us and converted effectively into pre-positioned weapons of mass destruction.

In a worst-case scenario, a successful attack on a facility using toxic chemicals in a densely populated area—and we know that those facilities do exist—could put hundreds of thousands of lives at risk. So there was a need for action.

In 2005 and 2006, under the leadership of Senator Collins, this Committee spent a fair amount of time exploring these risks and drafting legislation to address the threat. I was pleased to cosponsor that legislation, and while it did not itself become law, it certainly helped prompt Congress, in late 2006, to grant the Department of Homeland Security (DHS) limited authority to begin a chemical site security program. DHS has taken up that charge and launched the Chemical Facilities Antiterrorism Standards program

(CFATS). The Department deserves credit for the hard work it has done to design and begin to implement these standards. It is a particularly challenging task because of the wide array of companies that use potentially dangerous chemicals and the limited guidance Congress gave in the initial authorization.

Today we want to take stock of how the program is faring and determine how to strengthen it going forward, since the program's initial 3-year authorization has lapsed and we are now operating on a 1-year extension.

I am pleased to say that though there was intense controversy over whether to begin a chemical security program at all because of opposition to government regulation in this area, there now seems to be general agreement that CFATS is making a positive contribution to our national and homeland security and should be continued. So the question becomes: Should we improve it and, if so, how can we improve the CFATS program as we extend it?

I want to briefly discuss in this statement two issues that are commonly cited by some as ways to add strength to the program.

First, the current authorization exempts drinking and waste water facilities, even though we know that some of these facilities would pose a high risk to surrounding communities in the event of a terrorist attack because of the chemicals used there. Does that exemption make sense? Personally, I join with the Administration in thinking that exemption leaves a troublesome security gap.

Second, the current authorization is silent on the issue of inherently safer technology (IST), the practice of using safer chemicals or processes to reduce the risks at a chemical facility. I think it is important to look at these alternatives as part of a comprehensive security system since they are the only foolproof way to defeat a terrorist determined to strike a chemical facility. And there are encouraging developments on this front. For instance, Clorox recently announced it will begin substituting high-strength bleach for chlorine in its manufacturing process, a move that should greatly reduce the transport and storage of toxic chlorine gas in relation to its operations. I know that some of my colleagues strongly oppose mandating inherently safer technology systems, or even mandating consideration of them, so we are going to have a good healthy debate on that as we move forward, and we should.

The House has already passed a CFATS reauthorization bill, which is H.R. 2868, which has been referred to this Committee. The House bill would make significant changes in the program, such as including an IST component and creating parallel security programs for drinking and waste water facilities at the Environmental Protection Agency (EPA).

Closer to home, here in the Senate and this Committee, Senators Collins, Pryor, Voinovich, and Landrieu have offered a 5-year reauthorization of the existing rules, and that is S. 2996. So we have before us two different approaches on how to move forward, and we may, I would guess, hear some additional ideas this morning from the witnesses or from other Members of the Committee.

We are fortunate to have as witnesses some Administration and private sector leaders on these issues, and we will call on them soon and look forward to their testimony.

Senator Collins.

OPENING STATEMENT OF SENATOR COLLINS

Senator COLLINS. Thank you, Mr. Chairman.

More than 70,000 products are created through the use of chemicals, helping to supply the consumer, industrial, construction, and agricultural sectors of our economy. The United States is home to thousands of facilities that manufacture, use, or store chemicals.

This industry is vital to our economy, with annual sales of nearly half a trillion dollars, exports of $174 billion, and direct employees exceeding 850,000 people.

But as the Chairman indicated, after September 11, 2001, we realized that chemical facilities were vulnerable to terrorist attack. Given the hazardous chemicals present at many locations, terrorists could view them as attractive targets, yielding a terrible loss of life, significant injuries, and major destruction if they were successfully attacked.

In 2005, as Chairman of this Committee, I held a series of hearings on chemical security. Following these hearings, Senators Lieberman, Carper, Levin, and I introduced bipartisan legislation authorizing the Department of Homeland Security to set and enforce security standards at high-risk chemical facilities. My view of what happened to that bill is a little different from the Chairman's. In my view, it was incorporated into the homeland security appropriations act and signed into law in 2006. In fact, I remember well how difficult the negotiations were with the Bush Administration and the House as we proceeded with that bill.

To implement this new authority, DHS established the Chemical Facility Antiterrorism Standards program. This program sets 18 risk-based performance standards that high-risk chemical facilities must meet. The security standards cover a wide range of threats, such as perimeter security, access control, theft, internal sabotage, and cybersecurity.

High-risk chemical plants covered by the program are required to conduct vulnerability assessments, develop site security plans, and invest in protective measures. The Department must approve these assessments and site security plans, using audits and inspections to ensure compliance. The Secretary—and this was an authority that I insisted on—is empowered to actually shut down facilities that are non-compliant.

This risk-based approach has made the owners and operators of chemical plants partners with the Federal Government in implementing a successful, collaborative security program.

This landmark law has been in place slightly more than 3 years. Taxpayers have invested nearly $300 million in the program. Chemical plants also have invested hundreds of millions more to comply with the law. As a direct result, security at our Nation's chemical facilities is much stronger than it was 5 years ago.

Now we are at a juncture where we must reauthorize the program or, as some have proposed, scrap what has clearly been a clear success and set off in a different direction. My view is that we should reauthorize the law.

Simply put, the program works and should be extended.

Proposals to drastically change this successful law would discard what is working for an unproven and burdensome plan. We must not undermine the substantial investments of time and resources already made in CFATS implementation by both DHS and the private sector. Worse would be requiring additional expenditures with no demonstrable increase to the overall security of our Nation.

Last November, as the Chairman has indicated, the House passed a bill that would alter the fundamental nature of the chemical security law. It would require the Department to completely rework the program. I am concerned about several aspects of the House bill, not the least of which is the authority to mandate the use of so-called inherently safer technology.

What is IST? It is an approach to process engineering. It is not, however, a security measure. An IST mandate may actually increase or unacceptably transfer risk to other points in the chemical process or elsewhere in the supply chain. Currently DHS cannot dictate specific security measures like IST, nor should it. The Federal Government's job should be to set the performance standards, but to leave it up to the private sector to decide precisely how to achieve those standards. Forcing chemical facilities to implement IST could actually cost jobs at some facilities and affect the availability of many vital products.

Last year, one of the associations which will be testifying before us today testified that mandatory IST would restrict the production of pharmaceuticals and microelectronics, hobbling those industries. The increased cost of a mandatory IST program may force chemical companies to simply transfer their operations overseas, costing American workers thousands of jobs, at a time when we can least afford job loss.

Now, I want to be clear that some owners and operators of chemical facilities may choose and do choose to implement IST. But that decision should be theirs, not a decision established in Washington. Our focus is to make sure that the standards are met, not to dictate how to meet those standards.

Congress should not dictate specific industrial processes—we do not have that expertise—under the guise of security when a facility could choose other alternatives that meet the Nation's security needs.

A straightforward, common-sense reauthorization of this program is, however, critical. The legislation which I have introduced with Senators Pryor, Voinovich, and Landrieu would extend the CFATS program for 5 more years. And, Mr. Chairman, I would ask to submit for the record 27 letters of support for S. 2996. They range from the Chamber of Commerce to the American Forest and Paper Association, and many others, and I would ask that those be submitted for the record.[1]

Chairman LIEBERMAN. Without objection, so ordered.

Senator COLLINS. Mr. Chairman, no one is more conscious than I of the risks that our Nation faces through an attack on a chemical facility. That is why I was the primary author of the chemical facility security bill, and it is why I battled considerable opposition to get this landmark law enacted. We should support the continuation of a program that is working, and we should do so without the addition of costly and unproven Federal mandates.

Thank you, Mr. Chairman.

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[1] The letters submitted by Senator Collins appear in the Appendix on page 238.

Chairman LIEBERMAN. Thanks, Senator Collins.

Mr. Beers, welcome. We are not going to abuse you as we have earlier when Secretary Napolitano did not make it here at the starting time of a hearing, but we are just glad to see you here.

Mr. Beers is the Under Secretary for the National Protection and Programs Directorate (NPPD) at the Department of Homeland Security. In this capacity, he leads the Department's efforts to reduce risks to physical, communications, and cyber infrastructure. Accompanying Mr. Beers today is Sue Armstrong, Acting Deputy Assistant Secretary for Infrastructure Protection in the Department of Homeland Security.

Mr. Beers, we would welcome your testimony now.

TESTIMONY OF HON. RAND BEERS,[1] UNDER SECRETARY, NATIONAL PROTECTION AND PROGRAMS DIRECTORATE, U.S. DEPARTMENT OF HOMELAND SECURITY, ACCOMPANIED BY SUE ARMSTRONG, ACTING DEPUTY ASSISTANT SECRETARY FOR INFRASTRUCTURE PROTECTION, U.S. DEPARTMENT OF HOMELAND SECURITY

Mr. BEERS. Thank you very much, Mr. Chairman, Ranking Member Collins, Senator Voinovich, and other Members of the Committee who are not present. It is a pleasure for me to be here today to discuss with you the Department of Homeland Security's regulatory authority for security at high-risk chemical facilities. I am pleased to be joined by Peter Silva from the Environmental Protection Agency and, of course, my colleague at DHS, Sue Armstrong. I think we have developed a constructive relationship with the Environmental Protection Agency and look forward to a continued dialogue with them as we move forward together on this important issue.

As you are aware, and as Senator Collins just noted, the Department's current authority expires in October of this year, and we are eager to work with this Committee as one of the central elements of the Congress and, as Senator Collins indicated, the author of the original CFATS legislation. We are eager to work with you, with all levels of government, and with the private sector to achieve passage of appropriate legislation that permanently authorizes and appropriately matures our chemical security program.

The CFATS program has been, I think, a tremendous success to date, due in large part to the work of this Committee which, through its initial work on this issue, gave the Department of Homeland Security a solid foundation upon which to build a comprehensive chemical security program. CFATS currently covers over 6,000 high-risk facilities nationwide across all 50 States. The Department continues to issue final tier notifications to approximately 500 facilities across all four risk tiers each month and expects to notify all of the 6,000-plus facilities of their final tier assignments by the end of the summer of 2010.

We began in February of this year the inspection program of the final tiered facilities starting with the Tier 1 facilities, or the highest-risk facilities. Since the release of CFATS in April 2007, the Department has taken significant steps to publicize the rule and to ensure that our security partners are aware of its requirements. We have also made a point to solicit feedback from both the public and private sector partners in this endeavor and, where appropriate, to reflect that feedback in our implementation activities.

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[1] The prepared statement of Mr. Beers appears in the Appendix on page 44.

The Department also continues to focus on fostering solid working relationships with State and local officials as well as first responders in jurisdictions with the high-risk facilities. To meet the risk-based performance standards under CFATS, facilities need to cultivate and maintain an effective working relationship—including a clear understanding of roles and responsibilities—with local officials who could aid in preventing or mitigating or responding to potential attacks.

In addition, we are working with the private sector as well as all levels of government to identify facilities that may meet the threshold for CFATS regulation but have not yet registered. We have completed pilot efforts in both New York and New Jersey, and we have commenced a targeted outreach effort to certain segments of the industry for which we believe compliance may need improvement.

We have also enjoyed a constructive dialogue with Congress, including this Committee, as it contemplates new authorizing legislation. The Department supports a permanent authorization for the CFATS program, and we intend to provide Congress with a draft of a comprehensive authorization bill this fiscal year.

We recognize, however, the time constraints and challenges in passing such comprehensive legislation, which is why the President's fiscal year 2011 budget indicates a request for a 1-year extension of CFATS to ensure the time, if needed, to complete enactment of a permanent program.

It is important to highlight, therefore, the Administration's guiding principles in this reauthorization of CFATS, which will be the foundation of the Department's legislative position on the permanent CFATS reauthorization.

The Department believes that we should be given reasonable deadlines to implement any new legislative requirements, and CFATS, as currently implemented, should remain in effect until supplemented by any new regulations which the Congress should deem to put forward.

The Administration also supports, where possible, using inherently safe technology such as less toxic chemicals to enhance the security of the Nation's high-risk chemical facilities. We recognize, however, that risk management requires balancing threat, vulnerabilities, and consequences with the costs and benefits that might mitigate risk. Similarly, we would take into account potential public health or environmental consequences of any alternative chemical that might be considered with respect to the use of safer technology.

In this context, the Administration has established the following policy principles in regard to inherently safer technology at high-risk chemical facilities:

The Administration supports consistency of IST approaches for facilities regardless of the sector.

The Administration believes that all high-risk chemical facilities should assess IST methods and report that assessment in the facility's site security plan and that the appropriate regulatory entity using regime-wide guidelines should have the authority to require Tier 1 and Tier 2 facilities to implement IST methods if such methods demonstrate an enhancement of overall security, are determined to be feasible, and in the case of the water sector in particular, consider public health and environmental requirements.

The Administration believes that flexibility and staggered implementation would be required in implementing any new IST policy, should Congress choose to pass that policy.

The Administration also supports maintaining the Department's current Chemical Terrorism Vulnerability Information (CVI), regime for protecting sensitive information relating to chemical facility security.

As DHS and EPA have stated before, we believe that there is a critical gap in the U.S. chemical security regulatory framework, namely, the exemption of drinking water and wastewater treatment facilities from CFATS. The Department supports amending the current exemption to specify that EPA should have the lead on regulating for security with the Department of Homeland Security supporting EPA to ensure consistency across all sectors.

The Department supports modifying the exemption for facilities regulated under the Maritime Transportation Security Act (MTSA), to require facilities currently subject to MTSA to submit information to the Secretary of Homeland Security to determine whether they should be designated as high-risk chemical facilities under CFATS.

We are ready to engage in technical discussions with the Committee staff, affected stakeholders, and others to work out the remaining details. We must focus our efforts on implementing a risk- and performance-based approach to regulation and in parallel fashion continue to pursue the voluntary programs that have already resulted in considerable success.

Thank you for holding this important hearing, and I would be happy to respond to your questions at an appropriate time. Thank you, Mr. Chairman.

Chairman LIEBERMAN. Thanks very much, Under Secretary Beers.

I understand that Ms. Armstrong will be available to answer questions but has no opening statement. Is that correct?

Ms. ARMSTRONG. Yes.

Chairman LIEBERMAN. Thank you very much.

Now we are going to hear from Peter Silva, who is the Assistant Administrator for Water at the Environmental Protection Agency. With more than 30 years in the water and wastewater management fields, Mr. Silva is a leader in efforts to ensure the safety of drinking water and the viability of aquatic ecosystems.

We appreciate your presence and would ask for your testimony now.

TESTIMONY OF HON. PETER S. SILVA,[1] ASSISTANT ADMINISTRATOR FOR WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. SILVA. Thank you. Good morning, Mr. Chairman, Ranking Member Collins, and Members of the Committee. I am Peter Silva, Assistant Administrator for Water at the U.S. EPA. I welcome the opportunity to discuss EPA's efforts to promote security and resiliency in the water sector with an emphasis in addressing chemical security at water facilities, and I am very pleased to be here with Under Secretary Beers as we discuss this important issue.

EPA has worked over the last several years to support the water sector in improving security and resiliency, and I am pleased to report that the sector has taken its charge seriously. EPA has been entrusted with important responsibilities for coordinating the protection of the water sector through congressional authorization under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002—the Bioterrorism Act—and through presidential mandates under Homeland Security Presidential Directives 7, 9, and 10.

Promoting the security and preparedness of the Nation's water infrastructure remains a priority of the Agency in a post-September 11, 2001, and post-Katrina world. A loss of water service can seriously jeopardize the public health, economic vitality, and general viability of a community. In working with the water sector, we have emphasized a multi-layered approach to security consisting of prevention, detection, response, and recovery so that we can assist water facilities in avoiding incidents and, should an incident occur, in quickly identifying and recovering from such events.

At this point I would like to take a step back to consider the broader implications of chemical security for the water sector. It is of paramount importance to us to acknowledge in this discussion that the primary purpose of drinking water systems is the provision of safe drinking water, while that of wastewater systems is the protection of water bodies. In fact, the effective treatment of drinking water to control infectious diseases like typhoid and cholera has been hailed by the U.S. Centers for Disease Control and Prevention as one of the greatest public health achievements of the 20th Century.

Therefore, chemical security regulations, when applied to the water sector, should enable a reasoned balance of multiple, important factors so that we can achieve the joint policy goals of protecting public health and the environment while at the same time enhancing security.

EPA has worked closely with the water sector to assess and reduce the risks associated with hazardous chemicals. To this end, EPA and industry associations, often in partnership, have developed tools, training, and technical assistance to help drinking water utilities identify and mitigate those risks.

For example, EPA has developed software tools that assist drinking water systems with assessing vulnerabilities, including chemical storage and handling.

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[1] The prepared statement of Mr. Silva appears in the Appendix on page 56.

I understand this Committee and others in Congress are in the process of considering chemical security legislation. To inform those deliberations, the Administration has developed a set of guiding principles.

First, the Administration supports permanent chemical facility security authorities.

Second, cover systems that use substances of concern above threshold levels should be required to conduct an assessment of inherently safer technologies. Further, the appropriate regulatory agency should be authorized to require the highest-risk facilities to implement IST under certain conditions.

Third, the existing security gap for wastewater and drinking water facilities should be closed, with EPA having the authority to regulate chemical security at such water facilities.

As a final thought on the legislation, EPA supports a robust State role in the regulation of chemical security in the water sector, including a prominent role in IST determinations and auditing and inspections. This approach would leverage decades-old EPA and State relationships under the drinking water and wastewater programs, as well as the States' unique expertise and familiarity with individual water facilities.

In conclusion, over the past several years, we have made progress in ensuring the security of our Nation's drinking water and wastewater systems. We have produced a broad array of tools, training, and other assistance that the water sector uses to assess its vulnerabilities, reduce risk, and prepare for emergencies, including chemical theft and release. In developing these tools, we have worked effectively with our partners within the sector, and reached out to build new relationships beyond the sector, to ensure that water utilities can be prepared to prevent, detect, respond to, and recover from intentional incidents and natural disasters.

With respect to security at water sector facilities, we look forward to continuing to work with Members of the Committee on legislation that ensures the security of drinking water and wastewater facilities while supporting the critical mission of these facilities for public health and environmental protection.

Thank you again for the opportunity to—for my role here in terms of water security, and I would be happy to answer any questions that you may have.

Chairman LIEBERMAN. Thanks, Mr. Silva. That is a good beginning. We will do 7-minute rounds of questioning for the Members.

Under Secretary Beers, I appreciate that in your opening statement you have committed to providing suggested bill language from the Administration that we might consider. What is your sense of timing on that? In other words, when do you think you could have that for us?

Mr. BEERS. Sir, the draft legislation exists within NPPD. It is awaiting the completion of this hearing before we start the clearance process in terms of moving forward to clear it both within the Department of Homeland Security and obviously with the rest of the Administration. It is not just DHS's legislative proposal. It would have to be an Administration proposal.

The time frame for that process is entirely dependent upon the degree of controversy that the draft legislation creates. I am a little reluctant to tell you—certainly I would not want to suggest that it is going to be up in the next couple of weeks.

Chairman LIEBERMAN. Right.

Mr. BEERS. I am hoping that it can be up in the next couple of months.

Chairman LIEBERMAN. That gives us a helpful guide as we go forward.

Let me ask you, Under Secretary Beers, a historical question about this, which is what we have learned about who in our communities is using these chemicals and where they are located. I know that many of the chemicals that are covered by CFATS may be regulated for safety or environmental purposes on an industry-specific basis. But the CFATS program was an attempt to craft broad security standards across a wide array of industries.

I know that at the beginning it was a challenge for the Department of Homeland Security to reach judgments about who should fall under the CFATS program, and I wanted to ask you whether based on that experience you think we, and the Department, have a clearer picture of where these potentially dangerous chemicals are located, and if so, how we might put that information to use both in our legislating but also to prepare communities against the risks of a possible attack.

Mr. BEERS. You are absolutely correct, this was a process that I think all of us learned from in terms of the development of the list of chemicals of interest and then the outreach program to get those firms who were going to be covered or who thought they might be covered to begin the process of providing materials to the Office of Infrastructure Protection so we could begin to catalog those.

As I indicated in my oral statement and in my written testimony, this is still an ongoing process, quite honestly. There is a category that we call outliers that were not covered in the original screening process, and which we are looking for in conjunction with state governments to try to make sure that the regime, in fact, covers all of those.

Having said that, in the two pilot programs that we have conducted in New Jersey and in New York State, based on the initial calculation of who might be covered and the end determination of who might be covered, we are pleased to discover that it is a very small number of firms that would actually be covered. Ms. Armstrong, correct me. It was in the neighborhood of 20?

Ms. ARMSTRONG. Yes.

Mr. BEERS. In each of those, and we thought it was a larger number, quite honestly, when we began the process.

So this has been a learning process which we would be happy to share with the Committee at any point in time to the extent that would be helpful in your considerations.

Chairman LIEBERMAN. Good. It would be helpful.

Let me ask you to speak a little bit more about the debate and discussion about inherently safer technologies. I appreciate your statement that the Administration would like to build a meaningful IST component into the CFATS program. I wonder at this point if you could talk about how you think that might best be done.

Mr. BEERS. If I can suggest that we all bear in mind that the legislation that you all produced was over the objection of a large segment of the chemical sector of the economy, and that the implementation of that regulation that you gave us ends up now being something that you tell us, not we tell you, that has been well received by the chemical industry, we would expect to take the same kinds of deliberative measures and the same kind of broad-based outreach before we even set the guidelines that we would have to set in order to ask facilities to modify their site security plans or their vulnerability assessments based on the consideration of an inherently safer technology.

We are not going to say in some kind of a blast email everybody revise your plans. We are going to sit down; we are going to talk to the industry; we are going to talk about what the environment in this area looks like. We are going to understand their concerns, and then we are going to suggest what the guidelines might be in order that they can then report back to us.

We would expect that this will be implemented, if it is passed, in a manner exactly consonant with the efforts to listen to all the stakeholders in this process before moving toward final implementation and the mandate or requirement to compel changes if we get to that point.

Chairman LIEBERMAN. So you have not reached a conclusion, am I right, about whether the Administration will recommend legislation that would mandate inherently safer technologies, for instance at a top tier based on risk, of chemical facilities, or whether the legislation would simply mandate consideration of inherently safer technologies?

Mr. BEERS. There are two levels in our proposal, sir. One would take the Tier 1 and Tier 2 facilities and give the Administration the ability to require that they adopt an inherently safer technology. That is a decision that would be made on a facility-by-facility basis. It would not take into account simply the issue that there was a clearly agreed upon inherently safer technology, that is, a change of the chemical or a change of the process.

Chairman LIEBERMAN. Right.

Mr. BEERS. There are other factors that would be taken into consideration, including the economic impact of such a change, the time frame over which such a change might, in fact, be implemented, whether or not they are in conflict with some public health or environmental requirement. This is not, "Gee, we have discovered this inherently safer technology; now you all go ahead and do it." It is going to be a dialogue starting from the very beginning of the process.

Chairman LIEBERMAN. I appreciate your answer. My time is up. Thank you. Senator Collins.

Senator COLLINS. Thank you, Mr. Chairman.

Mr. Secretary, only 10 months ago during your nomination before this Committee, you stated that the chemical security law, "is an effective program for addressing the security risks associated with the Nation's high-risk chemical facilities and is helping to make our country more secure."

You went on to say, “I believe the Department has developed an effective approach for both identifying high-risk chemical facilities and assessing the security risks associated with them.”

Finally, when you were asked whether you believed the CFATS program’s current requirements for physical protection of a facility were sufficient, you said yes.

Just to clarify for the record, since it is obvious from that testimony—and indeed your testimony today—that this law has worked well and that it has made a difference, is it fair to say that your first priority is to prevent the law from expiring?

Mr. BEERS. Were we unable to agree between the Congress and the Administration—and ultimately it is your decision to change the law, not ours—on the enhancements that we would be seeking, then it is absolutely critical that this legislation be reauthorized in its current form as a minimal statement of maintaining the progress that I think we have made, that you have given us the opportunity to make, yes.

Senator COLLINS. I want to talk a little bit about the inherently safer technology issue, since that is a major difference between the bill that Senator Pryor is the chief Democratic cosponsor of, and Senators Voinovich and Landrieu are cosponsors of, to extend the law.

Just this past weekend, in Houston, the Department of Homeland Security, working with the Center for Chemical Process Safety, held a conference with the world’s leading experts in chemical process safety, and the conference title is instructive. It is “Creating a Technical Definition of IST.”

We have talked to many of the participants of that conference, and I want to read to you what one of the leading experts emailed to us. He said, “With regard to the IST meeting in Houston, one thing is very clear. That is that there is still a lot of disagreement on just the definition of IST, let alone quantification methods, assessment methods, and a host of other issues.”

One expert, Dr. Sam Mannan, who is a leading expert in this field, has submitted testimony for the record, and I want to highlight a statement that he makes. He says, “There is no clearly established scientific basis on which inherently safer technology options could be mandated by any legislation or regulation at chemical facilities.”

The reason I mention this conference, which DHS helped to sponsor, is that it shows all the uncertainties surrounding IST. When the leading experts in the world say that there is not even a commonly agreed upon definition of IST, how in the world can we consider making that a Federal mandate?

Mr. BEERS. I would respectfully submit that the same kinds of issues were of concern when we drew up the list of chemicals of interest. This is an area that requires a great deal more work, and that is why I want to repeat that we are not, if you give us this authority, intending to proceed willy-nilly into an implementation regime.

We have been asking our Science and Technology Office for some time now to help us with the definition of inherently safer technology, to help us with models of inherently safer technology, to give us the kind of information that we would need were we to be required to do this.

So I fully understand and am aware that this is an area that requires a great deal more work. But we are in the process at this point in time of looking at what we would regard as a permanent reauthorization of the chemical facilities anti-terrorism legislation, and we would like to have this authority as part of that permanent reauthorization. So, yes, there is still work to be done. No question.

Senator COLLINS. Well, I guess the point that I would make is the Department has done a first-rate job of implementing this law. It has made a difference by your own assessment. And it is appropriate for us to set the security standards, but for us to mandate a particular approach, particularly an approach about which there are so many questions, to me is premature at best.

Let me just quickly in my remaining time switch to a different issue. In June of last year, your Deputy Under Secretary testified before the House Homeland Security Committee and was asked about the civil enforcement provisions included in the House bill, and he said, "I have a concern that civil litigation involving the CFATS regime would lead to a higher likelihood of disclosure of sensitive information."

Does DHS continue to oppose the civil suits included in the House-passed bill reauthorizing and changing the law?

Mr. BEERS. Before answering your question, I am obligated to tell you that the Administration has not taken a position yet on this particular issue. So in that context, the concern that we had previously, which is that the civil suit entry into a security regime and the need for a civil plaintiff to have the information necessary to bring this suit to bear or for the government to defend why it was opposed to this suit, will inevitably raise questions about an array of information that in the first instance would be information that was proprietary information on the part of the facility and vulnerability information on the part of the facility, both of which are currently protected by the regime that you have given us.

Second, the decision process for getting to a decision about a security plan, whether or not it included an inherently safer technology decision, or a non-decision, would also have potential as part of that process the use of even higher classified information that might bear on a specific threat to either the facility itself or to the sector. And we would like to keep that information in the security regime that it is. And while people have indicated that there might be a carve-out that would say that we could say, well, that was protected information, if that judgment were then subject to consideration by sources outside the government, then we would still be in the process possibility in which that information might be disclosed.

So we would very much be concerned about this, and the Administration will be taking this issue into consideration for an Administration position in the weeks ahead. But we do not have a position. That is our concern at this point.

Senator COLLINS. Thank you.

Chairman LIEBERMAN. Thanks, Senator Collins. Senator Voinovich.

OPENING STATEMENT OF SENATOR VOINOVICH

Senator VOINOVICH. Thank you, Mr. Chairman.

I just went over the bill's history. This bill passed in October 2006, and my recollection is that we spent an enormous amount of time on this piece of legislation listening to everybody, any group that was out there. The rules were issued in April 2007. The process, in November 2007, began with initial Top-Screen assessments, and inspections will commence in March 2010.

We have not even got into implementing the legislation that we have already passed, and I think to myself, in terms of management, do you have the people that you need to get the job done. You have also indicated in your testimony that DHS is currently undertaking a multi-year examination of inherently safer technology.

Do we realize where we are at today? Do we understand that we have a Federal Government that is in deep trouble and we keep expanding it and expanding it? For what? What are we going to get out of the inherently safer technologies?

Then we are going to move into the area of involving the EPA. Do you know, Mr. Silva, that many State EPAs in this country have laid off people? Do you realize how bad things are out in the States? And you are going to get them involved in more of this stuff? Do you realize that in my State we have 100 jurisdictions that are under orders from the EPA and their rate increases are 13 and 14 percent a year and they still cannot pay their bills? And you are talking about getting EPA more involved and increasing the cost of running those facilities?

Let us get real. Do the people in this Administration, does the President understand how bad things are out there? Does he understand it? And we just keep growing and growing the government, and the departments are being given more and more responsibilities and do not have the human capital to get the job done.

I think we need to get real, Mr. Chairman. If we are going to spend time on this issue, it is going to take a whole lot of time for us to go through this. It seems to me at this stage of the game the best thing we could do is reauthorize the program, give DHS the chance to get the program implemented, see how it works out, and then go on maybe 2 or 3 years from now and see how this program is working out. But to spend this Committee's time on going through this issue, getting the testimony, all of the other stuff that we are going to have to do, amendments and the rest of it—let us put it in perspective.

The real issue is: What is the need? Is there an overriding need that we have to do this now? Is there something that is going to happen that is catastrophic or something of that sort? We have not even implemented the program yet.

So that is the only thing I have to say. I could ask a bunch of questions whether you have the management people to get the job done or do you have the people, Mr. Silva, or where are you in terms of this IST assessment work and how long is it going to take you to figure out that issue. And once you grant the Letter of Approval to somebody that says they have complied with the law, are you going to come back with them 2 years later or 6 months later and say, by the way, we forgot about IST and let us go back over and do that?

Thank you, Mr. Chairman.

Chairman LIEBERMAN. Thanks, Senator Voinovich. I would just say for the record—obviously, I understand what you are saying—that because the CFATS program has essentially run out, the President has recommended a 1-year extension in the budget to keep it going. And the House bill, which extends the program but alters it, came to the Committee, and Senator Collins, yourself, Senator Pryor, and Senator Landrieu have introduced legislation to extend it to 5 years. That is why we are holding the hearing as part of our oversight to see what we should do. Obviously, the Committee ultimately will work its will, but that is why I thought it was worth the hearing this morning.

Senator Pryor.

OPENING STATEMENT OF SENATOR PRYOR

Senator PRYOR. Thank you, Mr. Chairman, and I want to thank Senator Collins for taking the lead on this piece of legislation. As always, she is showing great leadership and I think really is trying to set the right public policy and the right course for the country.

Let me start with you, if I may, Under Secretary Beers, and let me ask about inherently safer technologies. I know we have already had a little bit of discussion about it today, but the Administration's guiding principles indicated that there should be a consistency of IST approaches for all facilities. Can you tell me what that means, a consistency of approaches for all facilities?

Mr. BEERS. Because we are also considering and proposing that the Environmental Protection Agency would retain its primary relationship with water and wastewater and would be the regulating authority, with or without inherently safer technology. Were inherently safer technology added to that then with respect to both the existing legislation and that possible addition, DHS—together with EPA—would set up a consistent regime for implementation across all the sectors.

We do not want to have one sector—let us just say water or wastewater—in a different regime. Obviously, the regimes will adapt, as we do already within DHS, with respect to the chemicals of interest that are not necessarily in the chemical sector.

So the notion here is to convey to you that there will not be a differentiated regime just because EPA is going to have responsibility for some part of the implementation of whatever the CFATS regime looks like, should you remove the exemption.

Senator PRYOR. But you are not talking about a one-size-fits-all.

Mr. BEERS. Absolutely not. This is sector by sector, facility by facility, and that is why the outreach program at the sector level is so important and why the individualized approach to each of the facilities is important.

Senator PRYOR. I think one thing that at least some of the Members of the Committee have, maybe all, is just this lack of clarity on what IST means and how it will be applied. So, I have some concerns about that, and I also have a concern about the cost factor if this concept or a similar concept goes forward. Because safety is one thing, and certainly that is very important. But there is also a very real cost factor for industries, communities, etc. Have you all talked about the cost factor?

Mr. BEERS. We have talked about that. That is a specific element in the consideration. In fact, for those who have also expressed a concern about the added cost of revising their security plan and/or assessments, we will take that into account in terms of the guidelines where we are asking for additional information with respect to inherently safer technology and, in particular, assist smaller firms if this legislation is implemented in the actual preparation.

The larger firms may have that information already available in their own data banks. We are not expecting that all firms will have that, and we are really not interested in imposing some kind of initial research requirement on any of the companies. That is why the other part of the outreach program will be the scientific community. That is why our Science and Technology Office has already begun trying to think about that issue well before this Administration came to office.

Senator PRYOR. And it sounds like you are working with the scientific community as well as with the private sector?

Mr. BEERS. Yes, sir.

Senator PRYOR. And are there new technologies that are coming online that may indeed be safer and maybe should be implemented?

Mr. BEERS. Sir, that issue is the particular issue in question. My understanding—and I profess not to be an expert in this issue, but I am trying to ensure that I am sufficiently informed. My understanding is that is the case, but let me ask my colleague Ms. Armstrong here with respect to that.

Ms. ARMSTRONG. Well, I think it is fair to say that part of the U.S. economy is being innovative and inventive, and I think from our dealings with the industry through the Sector Coordinating Councils that we have socialized a lot of CFATS and the tools and compliance mechanisms for CFATS with private industry, I think they are looking at newer advanced technologies. I think you may be hearing about some of those from the next panel, in fact.

Senator PRYOR. Thank you, Mr. Chairman. That is all I have.

Chairman LIEBERMAN. Thanks very much, Senator Pryor. Senator Carper.

OPENING STATEMENT OF SENATOR CARPER

Senator CARPER. Thanks very much. Ms. Armstrong, are there any questions you would like for me to ask of you? [Laughter.]

They are taking it pretty easy on you here this morning.

Mr. BEERS. Actually, I already prompted Senator Collins to ask me the two questions that I wanted asked on the reauthorization and DHS's concern about civil suits.

Senator CARPER. Good. I did not get the memo.

Mr. BEERS. We are trying to be bipartisan here.

Senator CARPER. A good thing. It is good to see all of you. Mr. Silva, very nice to see you. We thank you again for coming to Southern Delaware to help us move forward on a thoughtful approach to reducing runoff waste from chickens on the Delmarva Peninsula.

Mr. SILVA. Thank you, sir.

Senator CARPER. I hope we are making some progress. I am encouraged that we might be. But thank you for coming and thank you for continuing to pay attention to that issue.

As I think each of you might know, the Northeastern United States—and that includes Midatlantic States like Delaware—are the home of many of our Nation's largest chemical plants, and these plants can pose significant harm to the surrounding areas and to the people who live and work in those surrounding areas if they are not properly secured.

I believe that the Federal Government has an obligation to work with States to identify what works for a particular facility rather than imposing strict mandates that might hurt, we will say, a company as a whole.

I also understand that there is still considerable debate over inherently safer technologies—we have heard that again here this morning—and whether or not Congress should impose inherently safer technologies as an approach onto the chemical industry.

And I would just have maybe at least one of you take a minute to discuss the Administration's perspective, again, on inherently safer technologies and what would be the cost/benefit to mandating such a policy.

Mr. BEERS. Let me start on that, Senator Carper. We recognize that this is an area that is still in a process of being better defined. But having said that, we believe that just because an issue is difficult is not a reason to avoid trying to deal with that issue. We believe that in addition to the possibility in the chemical security regime to put in place a number of physical and procedural safeguards that will protect an individual facility and the surrounding citizenry, changing the way that facility actually conducts its operations is an additional way in which security can be increased.

So let me start with what we already have as a process, and that is that a facility can change the level of its holdings of a chemical of interest in order to reduce the risk, the security risk to the surrounding community. As Senator Collins has already said, that same facility could choose to change the way that it processes the chemicals or that it substitutes a less risky chemical for that, the notion here being that there is a range of activity that might allow these vulnerable facilities to reduce the risk both to themselves and to the surrounding communities. And if that process could result in the total reduction of risk for that facility to that community, then it seems to us that represents a forward security movement to totally remove that risk, and inherently safer technologies represent an approach to that.

This process I think will help all of us come to a better understanding and I think for facilities that we are working with to make their facilities safer. So that is the underlying idea behind wanting this authority.

Senator CARPER. All right. Thank you.

In the Administration's point of view, how has the CFATS, the Chemical Facility Antiterrorism Standards program been in protecting chemical plants since its enactment in 2007? What have been the challenges facing the Department of Homeland Security in the program's implementation, including maybe a lack of resources or a lack of funding?

Mr. BEERS. I am going to let my colleague here, who has lived through the entirety of this program, provide the real flavor to this. But let me just say from my own perspective, I think that the challenges have also been opportunities, and I think the opportunity here was to show that the Administration could be given responsibility for a program that it could implement in a way in which at the other end at this particular point in time Senator Collins tells me that the report from the chemical industry is that the Administration has done a good job, has been open to suggestions and comments and ideas from the regulated sector, while at the same time I think achieving a sense that all of us have that security at chemical facilities is a heck of a lot better than it was before you all provided us with this opportunity.

But, Ms. Armstrong, you have been close to this on a daily, weekly, and monthly basis, so why don't you add to that?

Ms. ARMSTRONG. Thank you, sir.

I would echo the Under Secretary in that implementing CFATS has been a challenge because it is doing something new to the Federal Government inside a new Department. But it has also been a successful opportunity to use the effective public-private partnership set forth in the National Infrastructure Protection Plan to engage the affected sectors, to have them tell us what they think all along the way, to have them pilot the tools that they will then use to comply with the program. And I think we have substantially grown the CFATS program both in terms of staffing, opening field offices, hiring the right people to do the job, and staying closely connected with industry.

So we have progressed from our initial regulatory due date for Top-Screens on January 22.

Senator CARPER. What are you saying, due date for Top-Screen?

Ms. ARMSTRONG. Top-Screen is the initial step to determine if a facility is preliminarily determined to be high risk. It is a consequence assessment that a facility in possession of Appendix A chemical of interest at or above screening threshold quantities submits to us and we evaluate it. So at that point in 2008, we had 29,453 Top-Screens in. We preliminarily tiered 7,010 facilities, and over 6,300 of those submitted security vulnerability assessments, which we are continuing to review.

We have assigned over 3,500 facilities a final tier, and they are doing and submitting their site security plans. We have 1,600 completed plans, and we are reviewing them, and we have begun the inspections process. So I think we have made, again, substantial progress.

Senator CARPER. All right. Thanks so much. My time has expired. Our thanks to each of you. Good to see you again. Thank you.

Chairman LIEBERMAN. Thanks, Senator Carper.

Senator Carper, Senator Collins, and I always look forward to your first question, because it is always unique and refreshing, and you did not disappoint.

Senator CARPER. I almost asked Ms. Armstrong, why do we use so many acronyms in the Federal Government? One of my briefing memos, we had in one sentence four acronyms.

Chairman LIEBERMAN. See?

Senator CARPER. I will save that one for the next panel. [Laughter.]

Ms. ARMSTRONG. Thank you, sir.

Mr. BEERS. I asked you that when I started the job, too.

Ms. ARMSTRONG. Oh, wait. Let me get to the best one: The State, Local, Territorial, and Tribal Government Coordinating Council (SLTTGCC).

Mr. BEERS. SLTTGCC. [Laughter.]

Senator CARPER. I rest my case.

Mr. BEERS. And I have worked in the State Department and with the Pentagon, so I know acronyms. That one just blew me away when I first heard it.

Chairman LIEBERMAN. I am not even going to ask you how you pronounce it. [Laughter.]

Mr. BEERS. We have been struggling with that, too, Senator Lieberman.

Chairman LIEBERMAN. Thank you. Senator Levin.

OPENING STATEMENT OF SENATOR LEVIN

Senator LEVIN. I am going to have to check the record to see what the first question was that I missed. It was not about acronyms, though, I guess. Thank you, Mr. Chairman, and our Ranking Member, for holding the hearing.

Has the Administration specifically taken a position on the House bill that they oppose or do not oppose?

Mr. BEERS. No, sir, we have not taken a position on the House bill.

Senator LEVIN. Do you oppose it or support it?

Mr. BEERS. I cannot speak for the Administration at this point.

Senator LEVIN. Can anybody here speak for the Administration?

Mr. BEERS. On that bill, no.

Senator LEVIN. On that question.

Mr. BEERS. No. We have not taken a position. You can draw an interpretation in that we plan to submit our own legislation.

Senator LEVIN. OK, and I understand the question was asked regarding when you are going to be submitting that language.

Of the 6,000-plus high-risk facilities that are covered under the—does everyone call it "CFATS"? I am afraid to use an acronym—CFATS standards, half apparently received final risk determinations, tier assignments, but only a quarter of the high-risk facilities have submitted security plans, and apparently only a few of the facilities have been inspected.

How long do you expect it will take to approve the plans? And how long will it take to inspect the facilities?

Mr. BEERS. Our plan is to inspect all the Tier 1 facilities by the end of this calendar year, sir.

Senator LEVIN. And the plans?

Mr. BEERS. That will be dependent upon the plans and the iteration back and forth. We had, in all candor, hoped to begin the inspection process in December. We did not, in part because of the iteration back and forth on the site security plans. But, Ms. Armstrong, do you have a better, more precise answer on that?

Ms. ARMSTRONG. No. That is correct. We have done preliminary inspections at two Tier 1 facilities this month; we will do 10 more next month, and our target is to get all of Tier 1, which is 235 facilities, done this year.

Senator LEVIN. And do you think that the inspections of high-risk facilities might help inform the reauthorization process? Will your experience in going and looking at those high-risk facilities give us some useful information, practical information to help us in the reauthorization issues?

Mr. BEERS. I cannot but believe that it would, but let me talk specifically about that question.

Part of the reason that we are doing the preliminary assessments is to ensure that the regime of the full inspections is informed by an understanding of that. At any point in this process of your deliberations, we would be happy to come forward and brief you on what we have done with respect to that as you would consider legislation.

Senator LEVIN. All right. Well, you might want to furnish that even if we do not ask if there is specific information that you get which——

Mr. BEERS. Point taken, sir.

Senator LEVIN. Thanks. There are, as I understand it, a number of current standards which are inconsistent with the House bill. Some of those CFATS standards are inconsistent. For instance, what information would be provided to law enforcement? Is there any consistency between the House language on that issue and the current regulation which protects that information more carefully? Could you give this Committee the list of what current standards are inconsistent with the House bill? Could you do that for the record?

Mr. BEERS. Yes, sir.

Senator LEVIN. Now on the IST issue, your testimony, as I understand it, says that the Administration will support IST for the Tier 1 and 2 facilities if the IST method "demonstrably enhances overall security" or is "determined to be feasible," and then something relative to the water sector. Who would have the burden to demonstrate under your proposed language? Is it the regulator that has the burden? Who has that burden?

Mr. BEERS. The decision process would be done by the regulator, and the decision information would be developed between the facility to be regulated and the regulator.

Senator LEVIN. Well, the decision, but who has the burden of demonstrating?

Mr. BEERS. The burden of demonstration would presumably be on the part of the facility.

Senator LEVIN. They have to demonstrate that it does not enhance overall security?

Mr. BEERS. If we are in a discussion about the Administration having a view that it does, they would have the opportunity to represent a countervailing view, yes, sir.

Senator LEVIN. Yes, but then where does the burden lie, the burden of proof? I mean, one says yes, one says, Hey, there is a——

Mr. BEERS. Then the regulator becomes the judge.

Senator LEVIN. The regulator is the judge. Then that goes to court?

Mr. BEERS. I am not a lawyer, sir, so——

Senator LEVIN. Oh, that is OK. Now, where does the cost come in here? And where does the impact on the environment of something which may be more secure but which has a negative environmental impact, how is that incorporated in your language?

Mr. BEERS. With respect to the cost, we would be seeking to understand what the cost of the facility would be to change from——

Senator LEVIN. Is that in your standard, your test?

Mr. BEERS. That is absolutely a part of our standards. This is not an effort to drive firms out of business or to impose——

Senator LEVIN. I understand that. I understand that it is not an effort to do that. The question is whether you inadvertently might do it or have such large cost increases that it may not be worth it in terms of the additional security compared to the additional cost and the additional negative environmental impact which might be created.

Mr. BEERS. Yes, sir.

Senator LEVIN. There are many specific situations where it may not be worth the cost. The delta, the improvement in security, may not be worth the cost. It may be a minor increase compared to a major cost increase. And there could be a negative environmental impact in that additional security requirement. And I want to know how in your standard is that incorporated. In the language that you used today, I do not see it. Was it in your opening statement, both those factors? All I saw was "demonstrably enhance overall security" and "be feasible." So something could be feasible but not worth it.

Mr. BEERS. Cost is specifically a factor that will be part of the decision process, and your formulation about whether the marginal return on security versus the cost required to do it would be a consideration which might bear on not choosing to do it.

With respect to public health and environmental requirements or risks that would somehow be created by an alternative chemical being used in the process, we are not going to make—that is, I think, a pretty clear balancing issue that says what security gain for what environmental or public health risk.

Senator LEVIN. I agree. It is clear it should be.

Mr. BEERS. Without being able to comment on a specific case, my view would be that would trump other considerations. But I am giving you a personal view now, sir.

Senator LEVIN. Well, that is my personal view, too, but I did not see it in your formulation. So I agree with your common-sense response to that, and I hope it is incorporated.

I am over my time.

Mr. BEERS. Well, it will be if I am the administrator of this, yes, sir.

Senator LEVIN. Thank you.

Mr. BEERS. Thank you for the opportunity, sir.

Chairman LIEBERMAN. Thanks, Under Secretary Beers. Thanks, Senator Levin.

I thank the members of the panel. We have a second panel, so the remainder of our questions we will submit to you for answers for the record. I thank you very much for your time, and we would now call the second panel to the table.

That would be Darius Sivin, Timothy Scott, and Stephen Poorman. While we are waiting, I, by unanimous consent, ask that we enter into the record letters in favor of the House bill on this subject and several reports on IST.[1]

I will begin some biographical information of our witnesses while they are shifting.

Darius Sivin is the legislative representative of the International Union of the United Automobile, Aerospace, and Agricultural Implement Workers of America (UAW), and also worked in UAW's Health and Safety Department.

Timothy Scott will testify on behalf of the American Chemistry Council (ACC). He is the Chief Security Officer and Corporate Director of Emergency Services and Security at the Dow Chemical Company responsible for managing security crisis management and emergency planning for Dow facilities around the world.

Stephen Poorman is the International Environmental Health Safety and Security Manager for Fujifilm Imaging Colorants. He has worked for more than 20 years in environmental safety and regulation in both the private and public sector, and he will testify today on behalf of the Society of Chemical Manufacturers and Affiliates, of which Fuji is one of almost 300 corporate members.

We thank the three of you for being here, and, Mr. Sivin, we look forward to your testimony now.

TESTIMONY OF DARIUS D. SIVIN, PH.D.,[2] LEGISLATIVE REPRESENTATIVE, INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE, AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA

Mr. SIVIN. Chairman Lieberman, Senator Collins, and Members of the Committee, I am Dr. Darius Sivin. I represent the International Union, and we appreciate the opportunity to testify at this hearing on "Chemical Security: Assessing Progress and Charting a Path Forward."

We and more than 50 partners in a coalition of labor, public interest, public health, and environmental organizations strongly believe that the existing Chemical Facility Antiterrorism Standard is inadequate. The path forward must be a comprehensive chemical security bill at least as strong as H.R. 2868.

As indicated, DHS has identified about 6,000 high-risk U.S. chemical facilities and classified them into four tiers. That number does not include drinking water or MTSA facilities, as indicated earlier. According to the Congressional Research Service (CRS), almost 100 U.S. facilities each put a million or more people at risk. Union members are concerned that their workplaces and communities are not adequately protected from deadly terrorist attacks on chemical facilities and drinking water systems, and it is the employees who will get hurt first and worst in case of any attack.

The UAW represents workers at more than 15 facilities that are required to file EPA risk management plans (RMPs), and therefore are potentially covered by chemical security legislation. These include a chemical manufacturer in Adrian, Michigan, and a wastewater facility in Detroit. Both of them use chlorine gas transported by the rail car. We are concerned that Detroit has recently been a terrorist target, and many of our members live and work in the vulnerability zone of the Detroit wastewater facility, which is more than 2 million people. Should there be a chlorine release from that facility due to a terrorist attack, the question will not be: Is government too big? Instead it will be: Why wasn't the government's authorities expanded to protect people from that?

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[1] The letters submitted by Senator Lieberman appear in the Appendix on pages 189–237.

[2] The prepared statement of Mr. Sivin appears in the Appendix on page 64.

We are encouraged by the fact that 11 wastewater treatment facilities in Michigan have already converted from chlorine gas to ultraviolet light or liquid chlorine bleach and that the Detroit facility can likely do the same thing.

Other UAW-represented facilities that are required to file RMPs include: A pigment facility in St. Louis, Missouri; a brewery in Trenton, Ohio; and a plumbing fixture manufacturer in Searcy, Arkansas. The Missouri facility could expose up to 88,000 people to anhydrous ammonia in case of an attack.

The UAW and our coalition partners believe that water facilities should be covered by chemical security legislation. In 2006, the Government Accountability Office reported that two-thirds of large U.S. wastewater facilities use a disinfectant other than chlorine gas or plan to switch away from chlorine gas. Many switches, according to the Center for American Progress, about 15, between 1999 and 2007, removed about 26 million people in nearby communities from vulnerability zones. The Center for American Progress reported that the cost of converting was typically no more than $1.50 per ratepayer per year, and many more could convert, removing another 25 million people from vulnerability zones. The cost is low. The alternatives, including chlorine bleach and ultraviolet radiation, are well established, safe for public health, and there is no reason that water facilities should not be covered.

We think that the solution is comprehensive chemical security legislation, and we oppose a mere extension of the existing CFATS program. Its authorizing statute, as mentioned, called Section 550, exempts wastewater treatment and MTSA plants. It also prohibits DHS from disapproving a plan merely because of the presence or absence of a particular measure.

In addition to the IST question, DHS, for example, could not disapprove a plan because a surveillance camera was put in a gaping hole in a fence instead of actually repairing the fence.

Also, Section 550 provides no redress procedure for an employee who poses no security risk, but who suffers an adverse employment decision due to erroneous or irrelevant information arising from a background check. And it fails to recognize that security requires that the public have enough information to hold the government accountable for protecting its security. This kind of protection needs to balance protection of security information.

It has been claimed that replacing CFATS with comprehensive chemical security legislation would force facilities to redo work they have already done. This claim is simply a red herring. It ignores the fact that H.R. 2868 was intentionally written to build seamlessly on the existing CFATS and that the ACC acknowledged that in its testimony of October 1, 2009. We and our coalition partners believe that Senate passage of a bill similar to H.R. 2868 would provide continuity and permanence to the CFATS program.

Such legislation should cover water facilities, require assessments of methods to reduce the consequences of a terrorist attack, and here I would like to address some issues.

One, it has been said in this room today that people favor a facility-by-facility method. H.R. 2868 is exactly that.

Two, the biggest change in IST, which is both true for water facilities and industrial facilities, is simply converting from chlorine gas to liquid chlorine. In many industries, that is the solution. It is tried and true. It is not radical. It is not new. It is not undefined. There are other solutions such as converting from hydrofluoric acid to sulfuric acid in refining, and we can go over them. But the major point here is we are not talking about anything radically new or undefined.

Also, the bill has a precise definition of methods to reduce the consequences of a terrorist attack, and the fact that academics may disagree on the definition of IST is simply irrelevant to H.R. 2868 because the words "inherently safer technology" appear nowhere in the bill.

I would like to say that we were very pleased with the process that led to the passage of H.R. 2868, which included input from all stakeholders, especially the ACC who praised the process both in testimony and in a letter to the Committee.

I would also like to say that we are quite convinced that requiring a facility to implement its own plan to reduce the consequences of a terrorist attack will have no negative impact on jobs. There are studies that show so. There is also the fact that Clorox expects no negative impact from its conversion of a paper mill in New Jersey, similarly. In contrast, jobs can be lost when disasters strike. For example, there is a Sunoco facility that is not going to be reopened after an ethylene unit exploded in Philadelphia.

In addition to that, should there be an exceptional case, H.R. 2868 has specific language endorsed by six unions who believe that the existing language of H.R. 2868 is such that those exceptional cases will be covered and are adequate to protect jobs. The requirement in H.R. 2868 that allows DHS to require a facility to implement its own plan, according to a letter signed by Representative Charlie Melancon and four colleagues from the Blue Dog Coalition, indicates that the provisions will apply to less than 3 percent of all facilities under CFATS, and they indicate that they endorse: "The legislation also provides a robust technical appeals process for chemical facilities that disagree with this determination. The Energy and Commerce Committee developed this provision using considerable input from the largest chemical industry association, the American Chemistry Council."

Chairman LIEBERMAN. Dr. Sivin, excuse me. Let me ask you if you would put the rest of your statement in the record because you are over your time.

Mr. SIVIN. Sure.

Chairman LIEBERMAN. I appreciate it. We will get back to you in the questions and answers.

Mr. Scott, welcome.

TESTIMONY OF TIMOTHY J. SCOTT,[1] CHIEF SECURITY OFFICER AND CORPORATE DIRECTOR, EMERGENCY SERVICES AND SECURITY, THE DOW CHEMICAL COMPANY, ON BEHALF OF THE AMERICAN CHEMISTRY COUNCIL

Mr. SCOTT. Chairman Lieberman, Ranking Member Collins, and Members of the Committee, my name is Timothy Scott, and I am the Chief Security Officer for the Dow Chemical Company. Dow is a member of the American Chemistry Council, and I am here today speaking on behalf of our industry association.

The three points I would like Committee Members to take away from my remarks are:

First, safety and security are top priorities of the chemical industry. Our industry, which is critical to our Nation's infrastructure and the quality of life in the United States and around the world, has taken aggressive action to improve its security posture voluntarily before the Chemical Facility Antiterrorism Standards were launched and continuing now with the successful implementation of CFATS.

Second, DHS has had many success stories in its short history, and the implementation of CFATS to date is already achieving its objectives to reduce the number of high-risk sites, lower the risk profile of remaining high-risk sites, and improve the security of all sites. CFATS is, in fact, working.

And, third, DHS should be allowed to maintain the current momentum and complete the task at hand using a risk-based methodology to establish stringent performance standards, and industry should be allowed to use the security tools that best address the security, operational, and business issues at each unique site to meet those established standards.

The American Chemistry Council represents the leading chemical companies in the United States who produce the essential products used in everyday life. Because of our critical role in the economy and our responsibility to our employees, communities, and shareholders, security continues to be a top priority for ACC members. In 2001, our members voluntarily adopted an aggressive security program that became the Responsible Care Security Code. Responsible Care implementation and regular independent review is mandatory for membership in the ACC.

The security code is a comprehensive security program that addresses both physical and cybersecurity vulnerabilities and requires ACC members to perform a comprehensive assessment of its security risks and implement appropriate protective measures throughout a company's value chain.

On April 9, 2007, the U.S. Department of Homeland Security published CFATS. This comprehensive Federal regulatory program requires every chemical facility to register with DHS using their Top-Screen to identify chemicals of interest above a threshold value and, for those considered a high risk, to conduct a thorough site security assessment and implement protective measures that comply with 18 risk-based performance standards.

Since CFATS became effective, the number of high-risk chemical facilities has been reduced by close to 1,000 facilities, a 14-percent improvement. This clearly demonstrates that CFATS is working, even though we are in the early stages of implementation.

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[1] The prepared statement of Mr. Scott appears in the Appendix on page 71.

CFATS is, in fact, working. Progress is being made, and we need to maintain the momentum without unnecessary diversions or obstacles. We were, therefore, pleased to see that Congress approved the DHS 2010 budget request and provided a 1-year extension for CFATS to November 2010. While this extension is helpful, we encourage Congress to provide permanence to the CFATS program, ensuring certainty and providing stability so the industry can continue to move forward making security investments.

On February 4, 2010, Ranking Member Collins introduced a bipartisan bill to extend the current CFATS regulations for 5 years. Titled "Continuing Chemical Facilities Antiterrorism Security Act of 2010," S. 2996 would give DHS sufficient time to fully implement the standards that are just now gaining traction. ACC supports that goal.

CFATS is by far the most robust, comprehensive, and demanding chemical security regulatory program to date. CFATS takes a well-designed approach, sets a high bar through performance-based standards, and then holds facilities accountable for meeting those standards by choosing from a full potential range of security enhancements.

The result is a security plan that is uniquely designed to address the specific risk issues of each individual facility. It is a risk-based and performance-based approach.

We, therefore, believe that it is unnecessary and inadvisable for Congress to provide DHS the authority to mandate prescriptive chemical process changes by including an IST provision within the CFATS regulatory program. Through the use of risk-based performance standards, CFATS has demonstrated that it drives facilities to consider all possible risk reduction options, including inherently safer approaches, when developing a site security plan. We are focused on results.

The highest-risk facilities subject to CFATS face significant capital investments to implement enhancements, thus providing additional incentive for the facility to consider all such risk reduction options in order to move into a lower risk-based tier or potentially out of the program. While you cannot mandate innovation, CFATS already provides the incentives to unleash the ingenuity, expertise and resources of the chemical industry. Congress should not abandon a strategy that employs performance-based security standards that recognizes the need for site-specific solutions and that holds facilities accountable while avoiding the potential for risk shifting.

CFATS is working today, and we need to continue the momentum to fully implement the standards developed in 2007. We need to let DHS finish the current task before revising the scope. The American Chemistry Council supports the bipartisan Senate legislation before this Committee as a step that provides certainty and ensures that this country continues to benefit from the security measures in place while recognizing the significant efforts already underway.

The members of the ACC are committed to a continuing and aggressive approach in safeguarding America's chemical facilities, and it is in this spirit that we look forward to working alongside DHS and this Committee. Thank you.

Chairman LIEBERMAN. Thank you, Mr. Scott. Very helpful testimony. I appreciate it. I look forward to the questions.

Mr. Poorman.

TESTIMONY OF STEPHEN E. POORMAN,[1] INTERNATIONAL ENVIRONMENT, HEALTH, SAFETY, AND SECURITY MANAGER, FUJIFILM IMAGING COLORANTS, INC., ON BEHALF OF THE SOCIETY OF CHEMICAL MANUFACTURERS AND AFFILIATES

Mr. POORMAN. Good morning, Chairman Lieberman, Ranking Member Collins, and Members of the Committee. My name is Steve Poorman, and I am the International Environment, Health and Safety Manager for Fujifilm Imaging Colorants, Incorporated. I am pleased to provide this testimony regarding the Chemical Facility Antiterrorism Acts Standards. I speak before you today on behalf of the Society of Chemical Manufacturers and Affiliates (SOCMA), of which my company is a member.

Less than 4 years ago, and working in a bipartisan manner, Congress enacted a strong chemical security regulatory program. It was this Committee's sustained effort over 2 years that drove that legislation. Thanks to the bipartisan leadership shown by your Committee, DHS and regulated facilities are deep in the middle of implementing this vital program in a focused and cooperative manner.

SOCMA strongly supports DHS's current CFATS program. This demanding program is now requiring over 6,000 chemical facilities nationwide to develop and deploy meaningful security enhancements. It protects facilities against attack without impairing the industry's ability to remain innovative and maintain some of the Nation's highest-paid jobs in the manufacturing sector.

Congress can best assure the CFATS program's success and forward momentum by passing S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act of 2010, as recently introduced by Ranking Member Collins, together with Senators Pryor, Voinovich, and Landrieu. This bill would reauthorize the CFATS program until 2015, thus allowing DHS and facilities to remain focused on successfully implementing that program as quickly as possible.

SOCMA is also supportive of the bill's provisions to create voluntary chemical security training and exercise programs. Properly executed, such programs would enhance the capabilities of high-risk chemicals facilities to prevent, prepare, and respond to acts of terrorism. Similar to provisions in the Security and Accountability for Every (SAFE) Port Act, these features of the bill would create valuable solutions to protect our Nation's critical infrastructure from a terrorist attack. Training and exercise programs would support a collaborative environment, involving Federal, State, and local governments, facilities, and public and private universities, all dedicated to achieving the goals set forth in the National Infrastructure Protection Plan.

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[1] The prepared statement of Mr. Poorman appears in the Appendix on page 75.

The House has taken a very different approach than the Senate so far to address the future of CFATS. First, it approved largely a partisan bill, H.R. 2868, with no support from the minority, not a single vote in favor. That bill includes provisions such as inherently safer technology that are fundamentally unwise and potentially counterproductive to our shared goal of preventing terrorist incidents at chemical facilities. The House bill was approved despite testimony from numerous witnesses who share strong concerns regarding these provisions.

As the voice of many small, medium, and large chemical manufacturers that employ thousands of employees in key manufacturing States, we ask you to please seriously consider our concerns about mandatory IST, especially in a security regulatory context.

One of SOCMA's greatest concerns with the House bill is the real possibility that its IST provisions will negatively restrict the production of active pharmaceutical ingredients (APIs), key raw materials that are included in DHS's Appendix A of covered chemicals. These APIs are used in prescription and generic drugs, life-saving vaccines, and over-the-counter medicines. They are thoroughly regulated by the Food and Drug Administretion (FDA) and must meet demanding quality and purity requirements. Substituting chemicals or processes used for API production would likely violate the conditions of their FDA approvals. Requiring IST could delay clinical trials while new replacement chemicals are identified or invented, and would force API manufacturers and their customer drug manufacturers to reapply for FDA approval of their products because of the significant change in the manufacturing.

SOCMA and its members have supported Federal regulations that require manufacturers to adhere to workplace safety requirements such as the Occupational Safety and Health Administration's Process Safety Management standard as well as mitigating off-site consequences in the event of an accident, such as EPA's risk management program. These are comprehensive, effective regulations that are already in place. However, process or product changes driven by IST mandates will have a negative impact on the jobs at facilities forced to make these changes. Spending money to design new products or conduct process changes necessarily causes companies to assess how they will pay for it. There is not much available capital these days for manufacturers to take on new regulations that are aimed at their livelihood, especially our small manufacturers.

There are other reasons not to require IST mandates other than cost, despite whether it is only an assessment requirement. Safety experts and academics have testified against mandating it. There is no consensus among experts about how to define it in a security regulatory context, and there is no method with which to measure it. While it may be feasible to develop a technical consensus methodology for measuring and comparing inherent safety, none exists at present. Before Congress and the Administration could even consider mandating IST assessment or implementation, they would need to know that methodologies exist to compare various alternatives from the standpoint of inherent safety.

As a pragmatic alternative, Congress might ask DHS to study the over 1,000 facilities that have changed products or processes and, thus, reduce their risk sufficiently that they have been removed from the CFATS program. But Congress should otherwise avoid legislating in this area while that process is still ongoing.

In conclusion, SOCMA supports permanent chemical site security standards that are risk-based and realistic, and we urge Congress to reauthorize the existing CFATS program. Mandating inherently safer technology as a security measure will inevitably create negative unintended consequences, and Congress should not require DHS to do so. SOCMA asks that you please support S. 2996 and maintain the same bipartisanship this Committee demonstrated in 2005 when it initiated the process that led to CFATS.

On behalf of SOCMA, I appreciate this opportunity to present the association's views on these important issues, and I look forward to your questions.

Chairman LIEBERMAN. Thanks, Mr. Poorman.

Let me begin with some questions about IST since it is at the center of this discussion about how to go forward. Both of you, I think, have stated in your opening statements and the ones you have given us for the record that existing CFATS rules have and will motivate facilities, chemical facilities, to consider and, at their own discretion, obviously, adopt inherently safer technology measures, in part because of the natural desire to move to a lower risk tier or potentially out of the program altogether.

Can you be more specific? Have there been cases that you are aware of where the existing CFATS rules have, in fact, motivated chemical facilities to consider and, at their discretion, adopt IST?

Mr. SCOTT. I can take a shot at answering that question. There are several examples. The easiest example of IST to see is reduction of inventories below the threshold level of any particular chemical that might be on the list. And in going back and looking at your process, that is a fairly easy thing to do in some cases, but not in all cases. So if you can reduce that inventory, you have come below the threshold value, and that would take you off the list. But there are other examples where we have looked at IST, and it is simply not economically feasible or operationally feasible to implement.

The bottom line on this is that IST is a part of the toolkit that you have available to meet the risk-based performance standards. And we think that is the way it should be included, as one of many security enhancements that you can look at to address the risk-based performance standards and meet those standards. And then the results are the proof of the effort that you have gone through.

Chairman LIEBERMAN. Mr. Poorman, do you want to add anything to that about the experience of your members?

Mr. POORMAN. Yes, absolutely. I think we can say pretty much the same type of thing where I would say that the examples that I have heard of from other member companies are where they are able to reduce inventory. And whether that shifts that inventory's risk to some other off-site location or not, I do not know. I do not know the complete details. But it does remove the risk from that particular facility, which would either lower its tier or, as you said, push it out of the program and remove it from the burden of the regulation.

Our members, we have a lot of small manufacturers, and we are batch manufacturers, and our processes are very unique. The value that comes from the chemicals that we produce are basically because it is the uniqueness of that molecule, and, therefore, the process is very specific.

So looking at that process, which we have done internally, it is a no-go or it is a go, and we really have limitations as to how much we can really alter our processes.

Chairman LIEBERMAN. Mr. Scott, obviously you are here on behalf of the American Chemistry Council. We appreciate that and have a lot of good working relations with the ACC. In the House, Marty Durbin, who represents the ACC, testified that ACC members are comfortable with a requirement to consider IST because they already do so under the group's Responsible Care Code. So I wanted to ask you two questions about that. One, is that correct? And, two, can you describe the approach Dow particularly or other ACC members have used to consider IST options?

Mr. SCOTT. Well, inherently safer technology is best considered in new process development when you are building a plan. That is the easiest time and the most economically feasible and operationally feasible time to implement IST. Going back to a facility that is already built and the process is already running and your products are already designed around that process is much more difficult. But Dow does include IST in the process design.

Chairman LIEBERMAN. Right.

Mr. SCOTT. We do include IST in the process design when we are developing plants. We include reviews of IST and process safety throughout on a regular review basis. And we included it in our site vulnerability assessments (SVAs) that we did both for the Responsible Care Security Code and as a result of CFATS.

You go back and you look at the sites, and we took in every situation with the SVAs, we had a physical security person and a process safety person go along and conduct those SVAs and looked at it from both perspectives to see what alternatives were there.

Chairman LIEBERMAN. Good to hear. So is it fair to say, as Mr. Durbin did in the House, that the ACC would be comfortable with a requirement to consider IST as opposed to mandating implementation of it?

Mr. SCOTT. In mandating, we have always been willing to sit down and talk with any organization or any group or any legislative body about various options around inherently safer technology. We have never come to a formal agreement where we have sat down and formalized the agreement that is our position. So we are not in support of mandating implementation or mandating consideration of IST.

Chairman LIEBERMAN. So perhaps we will take that second alternative up with you as this goes on.

Dr. Sivin, we have talked a few times, both Mr. Silva and yourself, about drinking water facilities and whether they ought to be included. And I think we have approached it on a somewhat technical and statutory basis. Just take a moment, because it may not be obvious, with a typical chemical facility, people understand how that might be the target of an attack. But what are we worried about when it comes to drinking water facilities?

Mr. SIVIN. We are worried about drinking water facilities that bring in chlorine gas by the rail car to treat the drinking water, and the releases of chlorine gas could affect both the workers who work there and the surrounding population.

The most simple change with demonstrably zero public health impact is instead of bringing chlorine in in gaseous form, bring it in in aqueous form as liquid bleach.

Chairman LIEBERMAN. Right.

Mr. SIVIN. In other cases, it may be possible to go to other technologies such as ultraviolet radiation, but at least there you have to do some public health analysis to see whether there is an impact or a change. Bringing in chlorine in liquid bleach, there is no question it is the same chlorine. It is just in a different form which cannot be breathed.

Chairman LIEBERMAN. Right. So are we concerned about an escape of chlorine in its non-bleach form or that it might be a subject of an attack, for instance, a terrorist attack?

Mr. SIVIN. Both.

Chairman LIEBERMAN. Both.

Mr. SIVIN. If a facility brings in chlorine gas by the rail car, the rail cars could be attacked at the facility. They could be attacked in the process of transferring chlorine from the rail car to the facility to treat the water could be attacked. And they could be attacked anywhere on the open rail. I realize the last case is a problem for the Transportation Committee and not this Committee, but just in terms of describing the problem, that is the problem.

Chairman LIEBERMAN. Very helpful. Thanks. My time is up. Senator Collins.

Senator COLLINS. Thank you, Mr. Chairman.

Mr. Chairman, it is obviously legitimate for us to have a robust debate over what the chemical security reauthorization bill should include. But I want to start my questioning of this panel by noting an issue that is not legitimate, and that is, when the Blue-Green Coalition in its letter to this Committee completely misrepresents comments that I previously made in 2007, doing so does not advance the debate and is certainly disappointing.

The coalition's letter to the Committee, dated March 1, 2010,[1] quotes me as saying, "In fact, Senator Collins' own comments to DHS in 2007 were clear. She said, 'The Department does not have broad discretion to regulate beyond the interim 3-year period without a comprehensive authorization from Congress. Any contrary interpretation of the sunset provision is plainly wrong.' "

That is exactly what I did say, and as the Chairman and other Members may recall, the debate back in 2007 with the Bush Administration was that the Bush Administration wanted the authorization to expire and to have only a continuing appropriation, which the Department was saying that it could use to set standards however it wanted to. And I was making very clear that it was Congress' prerogative to reauthorize the law.

So I think it is extremely disappointing that the Blue-Green Coalition, represented by Dr. Sivin today, deliberately misrepresented my comments, and I know it was deliberate because my staff has communicated with the coalition. So I just wanted to put that on the record. It was very disappointing, and it also does nothing to advance what is an important debate and legitimate disagreements over IST and other issues which reasonable people could certainly disagree on.

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[1] The letter referenced by Senator Collins appears in the Appendix on page 201.

There is another gross misinterpretation that I want to bring out, and we just heard it in Dr. Sivin's testimony. He claimed that based on his interpretation of the chemical security law and regulations, it "would be very difficult for DHS to disapprove of a plan that indicates that a surveillance camera would be used instead of fixing a gaping hole in a fence."

Now, first of all, I cannot imagine any chemical facility not caring about a gaping hole in its fence. But let us accept the premise that maybe there is an irresponsible chemical facility that does indeed have a gaping hole in its fence. I find the interpretation of the law by Mr. Sivin to be a gross misinterpretation of the authorizing law, the final rule, and the Department's own risk-based performance standards guidance document.

If you look at Section 550 of this document, there is a whole area on the perimeter's security, and Section 550 clearly states that the Secretary may disapprove a site security plan if it fails to satisfy the risk-based performance standards established by this rule.

I could go on and on, but I would like instead to ask our two experts here today, Mr. Poorman and Mr. Scott, whether you agree with Mr. Sivin's testimony that it would be very difficult for DHS to deal with that gap in perimeter security. Mr. Poorman.

Mr. POORMAN. Well, I would say that I would agree with you, Senator Collins, that I have never worked for any entity that would allow for such a gap to stay in effect, and I think that DHS could easily, through their risk-based standards that they are holding us all accountable to, do enforcement if somebody left a gap like that in their security perimeter fence in this case, absolutely.

We basically take a lot of time and effort and spend a lot of money in meeting these standards which are designed to harden our facilities against a terrorist attack. And that is the idea of the risk-based performance standards, and that is why we are fully in support of S. 2996, because it continues this program, which we think is very good for the chemical security of our country.

Senator COLLINS. Mr. Scott.

Mr. SCOTT. I agree with you, Senator Collins. First of all, the performance standards are very clear, and a security program that started off with a gaping hole in the fence, the plan would not be approved, and the site would be sent back to square one to come up with a better plan.

In addition, there is another risk-based performance standard. If you have an approved plan and your fence is whole and in good shape and you have electronic surveillance but you have to do maintenance and open a hole in that fence, there is a maintenance performance standard that you have to follow in how you secure that hole while the maintenance is being done, and when it is closed, it needs to be reported back to DHS.

So there is a very clear guidance on situations like that, and DHS certainly has the authority to disapprove a plan.

Senator COLLINS. Thank you.

Mr. Chairman, if I could proceed? Thank you. I want to discuss with our witnesses the issue of whether an IST mandate could transfer the risk to a different part of the supply chain or actually increase other risks. This is a complicated issue, and we just had a discussion of wastewater treatment plans and about the benefits of converting from chlorine gas to other procedures for purifying the water.

But the fact is it is not nearly that simple, and I would like to give an example that a water utility that is located in an isolated area of the Northwest gave to me. It told me that if Congress were to force the replacement of chlorine gas with sodium hypochlorite, then the utility would have to use as much as seven times the current quantity of treatment chemicals to get the same kind of water quality results.

Now, what does that mean? That means that the utility would have to have far more trucks delivering the bulk chemical into the watershed, and the greater quantities of chemicals and the increased frequency of truck deliveries would heighten the risk of an accident that would result in a chemical spill into the watershed. And, in fact, according to this utility, the accidental release of sodium hypochlorite into the watershed would likely cause greater harm to the soils, and vegetation, and streams than a release of chlorine gas in this remote area.

My point is that it is difficult to assess exactly what the replacement of one chemical for supposedly a less hazardous chemical will produce. And I would like to ask both of you to comment on the issue of transferring risk.

Mr. Scott, we will start with you.

Chairman LIEBERMAN. Senator Collins, if I may, and I apologize for interrupting. As Senator Collins knows, I have a previous commitment. I have to go on to another meeting. I have some other questions which I will submit for the record, and if you can, go as long as you like and then please wind up.

Senator COLLINS. Thank you.

Chairman LIEBERMAN. I thank the witnesses. It has been a good, thoughtful discussion, and the Committee will try to also act in a good and thoughtful way.

Senator COLLINS [presiding]. Thank you, Mr. Chairman. I will only proceed for a few more moments, but I very much appreciate your holding this hearing.

Chairman LIEBERMAN. Thank you.

Senator COLLINS. Mr. Scott.

Mr. SCOTT. There is the potential for shifting risk. As you mentioned, there are a lot of examples where the balance is very critical on how you apply the process or IST technologies to your process.

The other piece of this is the product differentiation, which I think was also mentioned earlier, the differences in the processes that make a Dow product, for example, those sorts of things.

So the shifting of risk is one of the major concerns that we have as far as the mandatory implementation of IST in the whole language, and that is why we think the best result is for the site to apply the whole realm of potential security enhancements to each site-specific instance so that we do not shift the risk but we meet the risk-based performance standards, which is the end goal, to meet those standards using any one of these alternatives.

The IST is not a panacea for all things security and all things process safety. It is a good tool, but it is one of many tools that we have available to us so we do make the right answer, we meet the risk-based performance standards, and we do not shift the risk to other areas at our sites.

Senator COLLINS. Mr. Sivin, do you not see a concern with shifting the risk?

Mr. SIVIN. H.R. 2868 prohibits DHS from approving any plan that shifts risk.

Senator COLLINS. Mr. Poorman, is it that easy to determine whether risk will be switched to a different part of the supply chain or to a different area?

Mr. POORMAN. Well, I think it would be very difficult. In our company members' specific situations, many of us are small batch manufacturers, as I said earlier, and our processes are very unique, and we know them best, and there is just a great concern about DHS telling us what to do with our processes. They are very specific to deliver a certain type of end product that goes to a customer. It has to meet their specifications and in some cases has to meet specifications that are basically written in stone with FDA, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, or other regulatory programs.

So it brings up a whole host of, I will say, collateral damage that could occur if we are instructed by the Department of Homeland Security to do something that would alter our process and shift risk potentially but also shifts risk to our ability to conduct business.

Senator COLLINS. From talking to many experts in this field, it seems that there is a great deal of dispute and that there is not an established scientific methodology for making that determination. Do you agree with that?

Mr. POORMAN. We certainly do, and we have been privy to witness a great deal of this debate. But we also know from our experience that chemical processes are complex, and the expertise lies usually in-house in the companies that develop it. Again, I go back to our example. We specifically develop very specific processes using really world-class expertise, process chemistry, and process technology. And when we do that effort, we make sure that these processes are as safe as can be to deliver the end result. And so we just feel that tinkering with that process could wreak havoc not only with shifting risks or making things more unsafe as an unwanted consequence, but also impacting our ability to do business.

Senator COLLINS. Mr. Scott, you made an interesting point that when Dow Chemical applies IST as a possibility or as a method of reducing risk, that is much easier to do if you are building a new plant or you are starting a new process. And, indeed, the water associations have told us about the overly simplistic assumption that mandatory chemical substitution is something that is easy, and they talk about the switch specifically from using chlorine gas to other chemicals and talk about that it would require a complete overhaul of a plant's units and that it could cause upwards of $100 million in some cases.

So could you comment further on the cost issue as far as the application of mandatory IST rather than focusing on what the goal is, what the standard is rather than telling a company how to achieve that standard. What are the cost implications?

Mr. SCOTT. Well, I do not have a dollar figure, but the cost implications could be significant. You are talking about process changes. You are talking about significant changes in the way you do your business, maybe in the products that you are able to make as opposed to developing a layered security approach around identified special targets within your facility that really improve the physical security.

One example that we have in Dow is that we produce chlorine, but we use our chlorine internally. We are an integrated facility, and have integrated sites within Dow across the United States. So that chlorine is used internally, but we do have to shift chlorine between facilities.

We were looking at opportunities to reduce the risk by stopping the shipment of chlorine from one plant to another and looked at a provider that was closer. But a molecule as simple as chlorine, the locally available chlorine was not compatible with our process. It is not an easy task to say chlorine is chlorine or any chemical is the same as that chemical somewhere else.

So, as a result, we are partnering with a company to build a facility closer to our facility. The difference, that is a considerable investment that is being made, but the end result is very good in that we have made some improvements in shipment at a facility that is not the same issue.

So we focus on IST as one of the potential options that is available to us to improve security, but it is only one of the options, and we have to look at that and get the right balance.

Senator COLLINS. Mr. Poorman, when people think of the chemical industry, they tend to think of Dow Chemical. They tend to think of large multinational enterprises, multi-billion-dollar corporations. And, of course, those large companies do make valuable contributions to our way of life and our economy.

But the fact is that the chemical industry is also compromised of thousands of small and medium-sized chemical companies, and they may focus on the production of just a few specific chemicals. They may sell their products to larger companies that use them for manufacturing or other industrial purposes. So their financial resources for regulatory compliance are far less than those of large companies.

Could you talk about what the implementation of inherently safer technology would mean for those smaller companies both in terms of their ability to operate efficiently, to provide jobs? Your comments in general.

Mr. POORMAN. Sure. I appreciate that opportunity, Senator Collins. Just relating back, the small chemical manufacturers are, again, typically batch manufacturers, making what we will call unique or novel molecules that provide some type of benefit to a product that is being made by the customer in many cases, and those are used in all sorts of applications and impact us in very positive ways.

But the problem lies in the complexities around this. The processes are very specific. They have been developed through a great deal of effort and expenditure to get to that point, and approvals in some cases by not only customers who are being sold the products that we make but also by regulatory entities such as FDA, an example of the pharmaceutical intermediates.

So if that changes, if someone comes in and indicates that, well, we could trade a raw material out, for instance, with something that somebody deems will be safer, of course, there will be debate as to whether that is true or not, but also we have to approach our customers and say we are going to have to ask you to change your proprietary formulation so that we can meet the requirements of the Department of Homeland Security, and you can probably imagine how our customers would react, especially when they can have the opportunity to have this material made outside of the United States of America.

So we are very concerned about that type of impact, but also, by changing the formulation, we may have to go back to a regulatory body such as FDA and make a request to change our proprietary formulation on a particular material that we are manufacturing. And that can take 1 to 4 years to go through that process. What do we do in the interim?

So these are the concerns we have about that, and these are the impacts that we would face as a small chemical manufacturer.

Senator COLLINS. Thank you. I want to thank our witnesses today for helping us understand this complex issue. I am going to submit three additional statements from various organizations for the record. In particular, the testimony of Dr. Sam Mannan, the Director of the Process Safety Center at Texas A&M, is very illuminative. He is a leading expert in the fields of chemical engineering and process safety, and his testimony focuses on the need for far more research and data before any kind of Federal mandate to implement or even consider IST should be incorporated into the law. So I am going to submit those three statements for the record.[1]

The Committee is going to be continuing to look at this important issue. It is ironic, as I look back on this law's birth, because it was extremely difficult to get this law enacted in the first place because the previous Administration was not enamored with having chemical security authorization. And today we can look back with pride on a lot that has been implemented effectively and in my view is working very well. And I think some of the skepticism in the chemical industry about having a Federal law has been replaced by a true partnership where industry has worked with the Department of Homeland Security and as a result, as Under Secretary Beers said today, our Nation is far safer.

So I look forward to working with the Administration, with my colleagues on both sides of the aisle, and with the Chairman as we pursue this issue.

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[1] The prepared statements submitted by Senator Collins appear in the Appendix on pages 270–305.

I also want to thank my staff for their hard work on this issue. This is enormously complex, and it is very important that we get it right. And in that regard, I thank our witnesses as well.

The record for this hearing will be held open for 15 days to allow for the submission of any questions for the record from our colleagues as well as additional testimony and other documents.

And, again, I want to thank all of the witnesses for being here today, and this hearing is now adjourned.

[Whereupon, at 11:50 a.m., the Committee was adjourned.]

APPENDIX

Opening Statement for Chairman Joseph Lieberman
"Chemical Security: Assessing Progress and Charting a Path Forward"
Homeland Security and Governmental Affairs Committee
March 3, 2010
As Prepared for Delivery

Good morning, we call this hearing this morning to review the federal government's efforts to strengthen the security of hundreds of chemical sites around our country, and to chart, if we can, a path forward to reduce the possibility that terrorists could take advantage of existing security vulnerabilities at these sites.

In the aftermath of 9/11, all of us developed a new awareness of potential targets of terrorists in our homeland. Many quickly realized that some of our nation's most robust and varied industries – while obviously a source of great economic strength and job creation –also inherently posed substantial security risks, if attacked. And that included the many facilities that produce or use hazardous chemicals that could be turned against us and converted, effectively, into pre-positioned weapons of mass destruction.

In a worst case scenario, a successful attack on a facility using toxic chemicals in a densely populated area – and we know that those facilities do exist – could put hundreds of thousands of lives at risk. So there was a need for action.

In 2005 and 2006, under the leadership of Senator Collins, this Committee spent a fair amount of time exploring these risks and drafting legislation to address the threat. I was pleased to cosponsor that legislation, and while it did not itself become law, it certainly helped prompt Congress, in late 2006, to grant the Department of Homeland Security (DHS) limited authority to begin a chemical site security program. DHS has taken up that charge and launched the Chemical Facilities Antiterrorism Standards program, which is known as CFATS. The Department deserves credit for the hard work it has done to design and begin to implement these standards. It is a particularly challenging task because of the wide array of companies that use potentially dangerous chemicals, and the limited guidance Congress gave in the initial authorization.

Today we want to take stock of how the program is faring and determine how to strengthen it going forward, since – the program's initial three-year authorization has lapsed, and we are now operating on a one-year extension.

I'm pleased to say that though there was intense controversy over whether to begin a chemical security program at all - because of opposition to government regulation in this area - there now seems to be general agreement that CFATS is making a positive contribution to our national and homeland security and should be continued. So the question becomes should we improve it and, if so, how can we improve the CFATS program as we extend it?

I want in this statement to briefly discuss two issues that are commonly cited by some as ways to add strength to the program. First, the current authorization exempts drinking and waste water facilities, even though we know that some of these facilities would pose a high risk to surrounding communities in the event of a terrorist attack because of the chemicals used there. Does that exemption make sense? Personally, I join with the Administration in thinking that exemption leaves a troublesome security gap.

Second, the current authorization is silent on the issue of "inherently safer technology" or IST, the practice of using safer chemicals or processes to reduce the risks at a chemical facility. I think it's important to look at these alternatives as part of a comprehensive security system, since they are the only foolproof way to defeat a terrorist determined to strike a chemical facility. There are encouraging developments on this front. For instance, Clorox recently announced it will begin substituting high strength bleach for chlorine in its manufacturing process, a move that should greatly reduce the transport and storage of toxic chlorine gas in relation to its operations. I know that some of my colleagues strongly oppose mandating inherently safer technology systems, or even mandating consideration of them, but we're going to have a good healthy debate on that as we move forward, and we should.

The House has already passed a CFATS reauthorization bill, which is H.R. 2868, which has been referred to this Committee. The House bill would make significant changes in the program – such as including an IST component and creating parallel security programs for drinking and waste water facilities at the Environmental Protection Agency.

Closer to home, here in the Senate and this Committee, Senators Collins, Pryor, Voinovich and Landrieu have offered a five-year reauthorization of the existing rules, and that is senate bill 2996. So we have before us two different approaches on how to move forward and we may hear additional ideas today from the witnesses or from other members of the Committee.

We are fortunate to have before us today as witnesses some Administration and private-sector leaders on these issues and we will call on them soon and forward to their testimony.

Statement of
Ranking Member Senator Susan M. Collins

Guarding America's Chemical Facilities

Committee on Homeland Security and Governmental Affairs
March 3, 2010

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More than 70,000 products are created through the use of chemicals, helping to supply the consumer, industrial, construction, and agricultural sectors of our economy. The United States is home to thousands of facilities that manufacture, use, or store chemicals.

This industry is vital to our economy, with annual sales of nearly half a trillion dollars, exports of $174 billion, and employees exceeding 850,000 people.

But after Sept. 11, 2001, we realized that chemical facilities were vulnerable to terrorist attack. Given the hazardous chemicals present at many locations, terrorists could view them as attractive targets, yielding a terrible loss of life, significant injuries, and major destruction if successfully attacked.

In 2005, as Chairman of this Committee, I held a series of hearings on chemical security. Following these hearings, Senators Lieberman, Carper, Levin, and I introduced bipartisan legislation authorizing the Department of Homeland Security to set and enforce security standards at high-risk chemical facilities. That bill was incorporated into the homeland security appropriations act and signed into law in 2006.

To implement this new authority, DHS established the Chemical Facility Anti-Terrorism Standards program, or CFATS. The program sets 18 risk-based performance standards that high-risk chemical facilities must meet. These security standards cover a range of threats, such as perimeter security, access control, theft, internal sabotage, and cybersecurity.

High-risk chemical facilities covered by the program must conduct mandatory vulnerability assessments, develop site security plans, and invest in protective measures.

The Department must approve these assessments and site security plans, using audits and inspections to ensure compliance with the

performance standards. The Secretary is empowered to shut down facilities that are non-compliant.

This risk-based approach has made the owners and operators of chemical plants partners with the federal government in implementing a successful, collaborative security program.

This landmark law has been in place slightly more than three years. Taxpayers have invested nearly $300 million in the program. Chemical plants also have invested hundreds of millions more to comply with the law. As a direct result, security at our nation's chemical facilities is much stronger than it was five years ago.

Now we are at a juncture where we must reauthorize the program or – as some have proposed – scrap what has been a clear success and set off in a different direction. I firmly believe that we should reauthorize the law.

Simply put, the program works and should be extended.

Proposals to drastically change this successful law would discard what is working for an unproven and burdensome plan.

We must not undermine the substantial investments of time and resources already made in CFATS implementation by both DHS and the private sector. Worse would be requiring additional expenditures with no demonstrable increase to the overall security of our nation.

Last November, the House of Representatives passed legislation that would alter the fundamental nature of CFATS. It would require the Department to completely rework the program. I am concerned about several aspects of the House bill, not the least of which is the authority to mandate the use of so-called "inherently safer technology," or IST.

What is IST? It is an approach to process engineering. It is not, however, a *security* measure.

An IST mandate may actually *increase* or unacceptably *transfer* risk to other points in the chemical process or elsewhere in the supply chain.

For example, many drinking water utilities have determined that chlorine remains their best and most effective drinking water treatment option. Their decisions were not based solely on financial considerations, but also on many other factors, such as the characteristics of the region's climate, geography, and source water supplies, the size and location of the utility's facilities, and the risks and benefits of chlorine use compared to the use of alternative treatment processes.

According to one water utility located in an isolated area of the Northwest, if Congress were to force it to replace its use of gaseous chlorine with sodium hypochlorite, then the utility would have to use as much as seven times the current quantity of treatment chemicals to achieve comparable water quality results. In turn, the utility would have to arrange for many more bulk chemical deliveries, by trucks, into the watershed. The greater quantities of chemicals and increased frequency of truck deliveries would heighten the risk of an accident resulting in a chemical spill into the watershed. In fact, the accidental release of sodium hypochlorite into the watershed would likely cause greater harm to soils, vegetation and streams than a gaseous chlorine release in this remote area.

Currently, DHS cannot dictate specific security measures, like IST. Nor should it. The federal government should set performance standards, but leave it up to the private sector to decide precisely how to achieve those standards.

Forcing chemical facilities to implement IST could cost jobs at some facilities and affect the availability of many vital products.

Last year, the Society of Chemical Manufacturers and Affiliates testified that mandatory IST would restrict the production of pharmaceuticals and microelectronics, hobbling these industries. The increased cost of a mandatory IST program may force chemical companies to simply transfer their operations overseas, costing American workers thousands of jobs.

To be clear, some owners and operators of chemical facilities may *choose* to use IST. But that decision should be theirs – not that of Washington.

Congress should not dictate specific industrial processes under the guise of security when a facility could choose other alternatives that meet the nation's security needs.

A straight-forward, common-sense reauthorization of this program is critical. The "Continuing Chemical Facilities Antiterrorism Security Act of 2010," which Senators Pryor, Voinovich, Landrieu and I recently introduced, would extend CFATS for five more years.

No one is more conscious than I of the risks our nation faces through an attack on a chemical facility. That is why I authored this law in the first place and battled considerable opposition to get it enacted. We should support the continuation of this successful security program without the addition of costly, unproven federal mandates.

Statement for the Record

Rand Beers
Under Secretary
National Protection and Programs Directorate
Department of Homeland Security

Before the
Committee on Homeland Security and Governmental Affairs
United States Senate

March 3, 2010

Thank you, Chairman Lieberman, Ranking Member Collins, and distinguished Members of the Committee. It is a pleasure to appear before you today to discuss the Department of Homeland Security's (DHS) regulatory authority for security at high-risk chemical facilities. As you are aware, the Department's current authority expires in October 2010 under Section 550 of the Fiscal Year 2007 Department of Homeland Security Appropriations Act, as amended. DHS is eager to work with this Committee, the larger stakeholder community across Congress, and all levels of government and the private sector to achieve passage of legislation that permanently authorizes and appropriately matures our chemical security program. In the interest of facilitating that collaboration, my testimony focuses on the current program and the key principles that DHS would like to see in future law.

Chemical Security Regulations

Section 550 of the FY2007 Department of Homeland Security Appropriations Act directed the Department to develop and implement a regulatory framework to address the high level of security risk posed by certain chemical facilities. Specifically, Section 550(a) of the Act authorized the Department to adopt rules requiring high-risk chemical facilities to complete Security Vulnerability Assessments, develop Site Security Plans, and implement protective measures necessary to meet risk-based performance standards established by the Department. Consequently, the Department published an Interim Final Rule, known as the Chemical Facility Anti-Terrorism Standards (CFATS), on April 9, 2007. Section 550, however, expressly exempts from those rules certain facilities that are regulated under other Federal statutes, including those regulated by the United States Coast Guard pursuant to the Maritime Transportation Security Act (MTSA); drinking water and wastewater treatment facilities as defined by Section 1401 of the Safe Water Drinking Act and Section 212 of the Federal Water Pollution Control Act, respectively; and facilities owned or operated by the Departments of Defense and Energy, as well as certain facilities subject to regulation by the Nuclear Regulatory Commission (NRC).

The following core principles guided the development of the CFATS regulatory structure:

1) Securing high-risk chemical facilities is a comprehensive undertaking that involves a national effort, including all levels of government and the private sector. Integrated and effective participation by all stakeholders—federal, state, local, and the private sector—is essential to securing our national critical infrastructure, including high-risk chemical facilities. Implementing this program means tackling a sophisticated and complex set of issues related to identifying and mitigating vulnerabilities and setting security goals. This requires a broad spectrum of input, as the regulated facilities bridge multiple industries and critical infrastructure sectors. By working closely with experts, members of industry, academia, and federal government partners, we leveraged vital knowledge and insight to develop the regulation.

2) Risk-based tiering to guide resource allocations. Not all facilities present the same level of risk. The greatest level of scrutiny should be focused on those facilities that, if attacked, present the most risk and could endanger the greatest number of lives.

3) Reasonable, clear, and calibrated performance standards will lead to enhanced security. The current CFATS rule includes enforceable risk-based performance standards. High-risk facilities have the flexibility to select among appropriate site-specific security measures that will effectively address risk. The Department will analyze each final tiered facility's Site Security Plan to see if it meets CFATS performance standards. If necessary, DHS will work with the facility to revise and resubmit an acceptable plan.

4) Recognition of the progress many companies have already made in improving facility security leverages those advancements. Many responsible companies have made significant capital investments in security since 9/11. Building on that progress in implementing the CFATS program will raise the overall security baseline at high-risk chemical facilities.

On Nov. 20, 2007, the Department published Appendix A to CFATS, which lists 322 chemicals of interest, including common industrial chemicals—such as chlorine, propane, and anhydrous ammonia—as well as specialty chemicals, such as arsine and phosphorus trichloride. The Department included chemicals based on the consequences associated with one or more of the following three security issues:

1) Release – Toxic, flammable, or explosive chemicals that have the potential to create significant adverse consequences for human life or health if intentionally released or detonated;
2) Theft/Diversion – Chemicals that have the potential, if stolen or diverted, to be used or converted into weapons that could cause significant adverse consequences for human life or health; and
3) Sabotage/Contamination – Chemicals that, if mixed with other readily available materials, have the potential to create significant adverse consequences for human life or health.

The Department established a Screening Threshold Quantity for each chemical based on its potential to create significant adverse consequences for human life or health in one or more of these ways.

Implementation and execution of the CFATS regulation requires the Department to identify which facilities it considers high-risk. The Department developed the Chemical Security Assessment Tool (CSAT) to identify potentially high-risk facilities and to provide methodologies that facilities can use to conduct Security Vulnerability Assessments (SVAs) and to develop Site Security Plans (SSP). CSAT is a suite of online applications designed to facilitate compliance with the program; it includes user registration, the initial consequence-based screening tool (Top-

Screen), a Security Vulnerability Assessment tool, and a Site Security Plan template. Through the Top-Screen process, the Department initially identifies and sorts facilities based on their associated risks.

If a facility is initially identified during the Top-Screen process as potentially having a level of risk subject to regulation under CFATS, the Department assigns the facility to one of four preliminary risk-based tiers, with Tier 1 indicating the highest level of potential risk. Those facilities must then complete SVAs and submit them to the Department. Results from the SVA inform the Department's final determinations as to whether a facility is in fact high-risk and, if so, of the facility's final tier assignment. Each one is carefully reviewed for its description of how chemicals of interest are actually held at the site, how those chemicals are managed, and for physical, cyber, and chemical security content.

Only facilities that receive a final high-risk determination letter under CFATS will be required to complete and submit either an SSP or Alternative Security Plan (ASP). DHS' final determinations as to which facilities are high-risk are based on each facility's individual consequentiality and vulnerability as determined by its Top-Screen, SVA, and any other available information.

After approval of their SVAs, the final high-risk facilities are required to develop SSPs or ASPs that address their identified vulnerabilities and security issues. The higher the risk-based tier, the more robust the security measures and the more frequent and rigorous the inspections will be. The purpose of inspections is to validate the adequacy of a facility's Site Security Plan and to verify that measures identified in the plan are being implemented.

To date, we have reviewed nearly 38,000 Top-Screen consequence assessment questionnaires submitted by potentially high-risk chemical facilities. Since June 2008, we have notified over 7,000 preliminarily tiered facilities that they have been initially designated as high-risk and are thus required to submit SVAs; we have nearly completed our review of the almost 6,200 SVAs that have been submitted. In May 2009, we began notifying facilities of their final high-risk determinations, risk-based tiering assignments, and the requirement to complete and submit an SSP or ASP.

CFATS currently covers 6,023 high-risk facilities nationwide across all 50 states, of which over 3,500 facilities have received final high-risk determinations and due dates for submission of an SSP or ASP. More than 1,600 facilities have submitted SSPs (or ASPs) to date, and the Department is in the process of reviewing these submissions.

Implementation Status

In May 2009, the Department issued 141 final tier determination letters to the highest risk (Tier 1) facilities, confirming their high-risk status and initiating their 120-day time frame for submitting an SSP. Since this initial set of final tier determinations, the Department has notified approximately 3,400 additional facilities of their final tier assignments. The Department continues to issue final tier notifications to approximately 500 facilities across all four risk tiers each month. The Department expects to notify all of the 6,023 covered CFATS facilities of their final tier assignments by end of summer 2010. In February 2010, the Department began conducting inspections of final-tiered facilities, starting with the Tier 1-designated facilities.

It should be noted that the CFATS compliance inspection is comprehensive and detailed. The Department intends to use these inspections to help gain a fuller understanding of the processes, risks, vulnerabilities, response capabilities, security measures and practices, and any other factors that may be in place at a regulated facility that affect security risk in order to determine if the facility meets the CFATS requirements.

A critical element of the Department's efforts to secure the nation's high-risk chemical facilities, the SSP enables final high-risk facilities to document their individual security strategies for meeting the Risk-Based Performance Standards (RBPS) established under CFATS. Each high-risk facility's security strategy will be unique, as it depends on the facility's risk level, security issues, characteristics, and other factors. Therefore, the Site Security Plan tool collects information on each of the 18 RBPS for each facility. The RBPS cover the fundamentals of security, such as restricting the area perimeter, securing site assets, screening and controlling access, cybersecurity, training, and response. The Site Security Plan tool is designed to take into account the complicated nature of chemical facility security and allows facilities to describe both facility-wide and asset-specific security measures. The Department understands that the private sector generally and CFATS-affected industries in particular are dynamic. The Site Security Plan tool allows facilities to involve their subject-matter experts from across the facility, company and corporation, as appropriate, in completing the Site Security Plan and submitting a combination of existing and planned security measures to satisfy the RBPS. The Department expects that most approved SSPs will consist of a combination of existing and planned security measures. Through a review of the SSP, in conjunction with an on-site inspection, DHS will determine whether a facility has met the requisite level of performance given its risk profile and thus whether its SSP should be approved.

Along with the initial group of final Tier 1 notifications and the activation of the Site Security Plan tool in May 2009, DHS issued the *Risk-Based Performance Standards Guidance* document. The Department developed this guidance to assist high-risk chemical facilities subject to CFATS in determining appropriate protective measures and practices to satisfy the RBPS. It is designed to help facilities comply with CFATS by providing detailed descriptions of the 18 RBPS as well as examples of various security measures and practices that would enable facilities to achieve the appropriate level of performance for the RBPS at each tier level. The *Guidance* also reflects public and private sector dialogue on the RBPS and industrial security, including public comments on the draft guidance document. High-risk facilities are free to make use of whichever security programs or processes they choose, provided that they achieve the requisite level of performance under the CFATS RBPS. The *Guidance* will help high-risk facilities gain a sense of what types and combination of security measures may satisfy the RBPS.

To provide a concrete example: In the case of a Tier 1 facility with a release hazard security issue, the facility is required to restrict the area perimeter appropriately, which may include preventing breach by a wheeled vehicle. To meet this standard, the facility is able to consider numerous security measures, such as cable anchored in concrete block along with movable bollards at all active gates or perimeter landscaping (e.g., large boulders, steep berms, streams, or other obstacles) that would thwart vehicle entry. The Department will approve the security measure as long as it is determined by the Department to be sufficient to address the applicable performance standard. Under Section 550, the Department cannot mandate a specific security measure to approve the Site Security Plan.

Outreach Efforts

Since the release of CFATS in April 2007, the Department has taken significant steps to publicize the rule and ensure that our security partners are aware of its requirements. As part of this dedicated outreach program, the Department has regularly updated impacted sectors and Government Coordinating Councils of industries most impacted by CFATS, including the Chemical, Oil and Natural Gas, and Food and Agriculture Sectors. We have also made it a point to solicit feedback from our public and private sector partners and, where appropriate, to reflect that feedback in our implementation activities. We have presented at numerous security and chemical industry conferences; participated in a variety of other meetings of relevant security partners; established a Help Desk for CFATS questions; put in place a CFATS tip-line for anonymous chemical security reporting; and developed and regularly updated a highly regarded Chemical Security Web site (www.DHS.gov/chemicalsecurity). These efforts are having a positive impact: over 38,000 Top-Screens have been submitted to the Department via CSAT.

Additionally, the Department continues to focus on fostering solid working relationships with state and local officials as well as first responders in jurisdictions with high-risk facilities. To meet the risk-based performance standards under CFATS, facilities need to cultivate and maintain effective working relationships—including a clear understanding of roles and responsibilities—with local officials who would aid in preventing, mitigating and responding to potential attacks. To facilitate these relationships, our inspectors have been actively working with facilities and officials in their areas of operation, and they have participated in over 100 Local Emergency Planning Committee meetings to provide a better understanding of CFATS requirements.

We are also working with the private sector as well as all levels of government to identify facilities that may meet the threshold for CFATS regulation but that have not yet registered with CSAT or filed a Top-Screen. We have completed pilot efforts at the state level with New York and New Jersey to identify such facilities in those jurisdictions. We are using these pilots to help the Department identify other facilities for our follow up. Further, we have commenced targeted outreach efforts to certain segments of industry where we believe compliance may need improvement.

Internally, we are continuing to build the Infrastructure Security Compliance Division that is responsible for implementing CFATS. We have hired, or are in the process of on-boarding, more than 140 people, and we will continue to hire throughout this fiscal year to meet our staffing goals of 268 positions. The FY 2011 budget request allows the Department to continue to meet program goals for hiring, training, equipping, and housing inspectors as well as to continue the development and deployment of compliance tools for covered facilities.

Legislation to Permanently Authorize CFATS

We have enjoyed a constructive dialogue with Congress, including this Committee, as it contemplates new authorizing legislation. The Department recognizes the significant work that this Committee and others, including the House Committee on Homeland Security and the House Committee on Energy and Commerce, have devoted to drafting legislation to reauthorize the CFATS program and to address chemical security at the nation's water systems. We appreciate this effort and look forward to continuing the constructive engagement with Congress on these important matters.

The Department supports a permanent authorization for the CFATS program. The Department is committed to working with Congress and other security partners to pass stand-alone chemical security legislation that includes permanent authority beginning in FY 2011.

While we remain committed to providing the Congress with a draft of a comprehensive authorization bill this fiscal year, we recognize the time constraints and challenges of passing such comprehensive authorization laws; thus the President's FY 2011 budget includes a request for a one-year extension of the statutory authority for CFATS, to ensure the time, if needed, to complete enactment of a permanent program while avoiding the sunset of the Department's regulatory authority on Oct. 4, 2010. Given the complexity of chemical facility regulation, the logistics of implementing, as well as the resource implications of any requirements considered in prospective legislation, should be taken into account to avoid having the Department to extensively revisit aspects of the program that are either currently in place or will be implemented in the near future.

It is important to highlight that the Administration has developed a set of guiding principles for the reauthorization of CFATS. The following principles are the foundation for the Department's legislative position on permanent CFATS reauthorization in line with the Administration's guiding principles:

- The Administration supports permanent authorization to regulate security of high-risk chemical facilities through risk-based performance standards.

- The Department should be given reasonable deadlines by Congress to promulgate new rules to implement any new legislative requirements. CFATS, as currently being implemented, should remain in effect until they supplemented by new regulations.

- The Administration supports, where possible, using safer technology, such as less toxic chemicals, to enhance the security of the nation's high-risk chemical facilities. We recognize, however, that risk management requires balancing threat, vulnerabilities, and consequences with the costs and benefits to mitigate risk. Similarly, the potential public health and environmental consequences of alternative chemicals must be considered with respect to the use of safer technology. In this context, the Administration has established the following policy principles in regards to inherently safer technologies (IST) at high-risk chemical facilities:

    - The Administration supports consistency of IST approaches for facilities regardless of sector.
    - The Administration believes that all high-risk chemical facilities, Tiers 1-4, should assess IST methods and report the assessment in the facilities' SSPs. Further, the appropriate regulatory entity should have the authority to require

facilities posing the highest degree of risk (Tiers 1 and 2) to implement IST method(s) if such methods demonstrably enhance overall security, are determined to be feasible, and, in the case of water sector facilities, consider public health and environmental requirements.

  - For Tier 3 and 4 facilities, the appropriate regulatory entity should review the IST assessment contained in the SSP. The entity should be authorized to provide recommendations on implementing IST, but it would not have the authority to require facilities to implement the IST methods.
  - The Administration believes that flexibility and staggered implementation would be required in implementing this new IST policy.

- The Administration supports maintaining the Department's current Chemical-terrorism Vulnerability Information regime for protecting sensitive information relating to chemical facility security. This regime is similar to, but distinct from, other Sensitive But Unclassified information protection regimes.

- The Department supports amending the current exemption for drinking water and wastewater facilities to specify that EPA would have the lead on regulating for security, with the Department supporting EPA to ensure consistency across all sectors; this consistency could be achieved, for example, by the use of CFATS compliance tools and risk analysis with modifications as necessary to reflect the uniqueness of the water sector and statutory requirements. As DHS and EPA have stated before, we believe that there is a critical gap in the U.S. chemical security regulatory framework—namely, the exemption of drinking water and wastewater treatment facilities from CFATS. We need to work with Congress to close this gap to secure substances of concern at these facilities and to protect the communities that they serve; drinking water and wastewater treatment facilities that meet CFATS thresholds for chemicals of interest should be regulated. We do, however, recognize the unique public health and environmental requirements and responsibilities of such facilities. For example, we understand that a cease-operations order that might be appropriate for another facility under CFATS would have significant public health and environmental consequences when applied to a water facility.

- The Department supports modifying the exemption for facilities regulated under the MTSA to provide that each chemical facility currently subject to MTSA shall submit information to the Secretary of Homeland Security to determine whether it would be designated as a high-risk chemical facility under CFATS. This will also ensure consistency across all sectors and provides important information for the Department to continue to evaluate regulatory regimes as part of its ongoing CFATS/MTSA harmonization efforts. The Secretary would be authorized to require the facility to update its existing vulnerability assessments or Facility Security Plans under MTSA to provide an adequate level of security.

- With respect to the other current statutory exemptions, the Department supports:
    - Maintaining the exemptions for Departments of Defense and Energy facilities; and
    - Amending the exemption for facilities regulated under the Nuclear Regulatory Commission (NRC) to clarify the scope of the NRC exemption and to specify that the Department of Homeland Security shall make the final determination as to whether a nuclear facility is exempt.

Conclusion

The Department is collaborating extensively with the public, including members of the chemical sector and other interested groups, to work toward achieving our collective goals under the CFATS regulatory framework. In many cases, industry has voluntarily made tremendous progress to ensure the security and resiliency of its facilities and systems. As we implement the chemical facility security regulations, we will continue to work with industry, our other federal partners, states, and localities to get the job done.

The Administration recognizes that CFATS reauthorization requires further technical work. The Department is ready to engage in technical discussions with Committee staff, affected stakeholders, and others to work out the remaining technical details. We must focus our efforts on implementing a risk- and performance-based approach to regulation and, in parallel fashion, continue to pursue the voluntary programs that have already resulted in considerable success. We look forward to collaborating with the Committee, industry, and government partners to ensure that the chemical security regulatory effort achieves success in reducing risk in the chemical sector.

Thank you for holding this important hearing. I would be happy to respond to any questions you may have.

TESTIMONY OF

Peter S. Silva
ASSISTANT ADMINISTRATOR
FOR WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE

COMMITTEE ON HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS

UNITED STATES SENATE

March 3, 2010

Introduction

Good morning Mr. Chairman, Ranking Member Collins, and Members of the Committee. I am Peter Silva, Assistant Administrator for Water at the United States Environmental Protection Agency. I welcome this opportunity to discuss EPA's efforts to promote security and resiliency in the Water Sector with an emphasis on our role in addressing chemical security at water facilities.

EPA has worked over the last several years to support the Water Sector in improving security and resiliency, and I am pleased to report that the sector has taken its charge seriously. EPA has been entrusted with important responsibilities for coordinating the protection of the Water Sector through Congressional authorization under the *Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (the Bioterrorism Act), and through Presidential mandates under Homeland Security Presidential Directives (HSPD) 7, 9 and 10. HSPD 22 (the domestic chemical defense) also applies to water protection.

Promoting the security and preparedness of the Nation's water infrastructure remains a priority of the Agency in a post-9/11 and post-hurricane Katrina world. A loss of water service can seriously jeopardize the public health, economic vitality, and general viability of a community. In working with the Water Sector, we have emphasized a multi-layered approach to security consisting of prevention, detection, response, and recovery so that we can assist water facilities in avoiding incidents and, should an incident occur, in quickly identifying and recovering from such events.

Implementation of Section 1433 of the Safe Drinking Water Act

Existing statutory requirements address chemical security at drinking water systems to a degree. Section 1433 of the Safe Drinking Water Act (added by the Bioterrorism Act of 2002) required each community water system providing drinking water to more than 3,300 persons to conduct a vulnerability assessment, certify its completion, and submit a copy of the assessment to EPA. These vulnerability assessments addressed security at water systems comprehensively, from water collection to treatment and distribution, and they specifically included the use, storage, or handling of chemicals. In addition, Section 1433 required each water system to prepare or revise an emergency response plan that incorporates the findings of the vulnerability assessment and to certify to EPA that the system has completed such a plan.

Since 2003, EPA has received 100% of the vulnerability assessments and emergency response plan certifications from large and medium community water systems serving more than 50, 000 people. Over 99% of small community water systems serving between 3,300 and 50,000 people have submitted their vulnerability assessments and emergency response plan certifications. EPA reviewed the vulnerability assessments to ensure compliance with Bioterrorism Act, and where necessary provided technical assistance to individual drinking water systems to bring these systems into compliance. EPA also initiated some enforcement actions against non-compliant systems.

EPA's Role in Chemical Security for Drinking Water and Wastewater Utilities

EPA's current approach for addressing chemical security in the Water Sector involves a long-standing effort to promote the voluntary adoption of countermeasures by water facilities. Before I discuss some of these activities, however, I would like to take a step back to consider the broader implications of chemical security for the Water Sector. It is of paramount importance for us to acknowledge in this discussion that the primary purpose of drinking water systems is the provision of safe drinking water, while that of wastewater systems is the protection of water bodies. In fact, the effective treatment of drinking water to control infectious diseases like typhoid and cholera has been hailed by the U.S. Centers for Disease Control and Prevention as one of the greatest public health achievements of the twentieth century.

Therefore, authorizing language should allow for a consideration of this essential public health and environmental mission, particularly with respect to any provision which may require a facility to consider alternative water treatment processes. In other words, chemical security regulations when applied to the water sector should enable a reasoned balance of multiple, important factors so that we can achieve the joint policy goals of protecting public health and the environment while enhancing security. Such factors include: efficacy of treatment in meeting public health and environmental requirements, security concerns, reliability of treatment, source water characteristics, feasibility, and operator safety.

Tools and Technical Assistance

EPA has worked closely with the water sector to assess and reduce the risks associated with hazardous chemicals. To this end, EPA and industry associations, often in partnership, have developed tools, training and technical assistance to help water utilities identify and mitigate those risks. A few examples of our efforts are as follows:

1. We developed tools that assist water systems with assessing vulnerabilities, including chemical storage and handling. Examples of the tools include:
   - The *Vulnerability Self Assessment Tool (VSAT™)* – a software package that supports water

and wastewater utility vulnerability assessments using a qualitative risk assessment methodology;

- The *Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems* – a manual specifically designed to help small water systems conduct vulnerability assessments; and
- The *Security Vulnerability Self-Assessment Guide for Very Small (<3,300) Systems*, which assists these systems in assessing their critical components and identifying security measures that should be implemented.

2. Under the Bioterrorism Act of 2002, EPA created a document to "provide baseline information to community water systems…regarding which kinds of terrorist attacks or other intentional acts are the probable threats to: (A) substantially disrupt the ability of the system to provide a safe and reliable supply of drinking water; or (B) otherwise present significant public health concerns." The baseline threat document addressed vulnerabilities related to the use, transfer and storage of chemicals, including the evaluation of different disinfection options. EPA provided this document to drinking water facilities to assist them in conducting their vulnerability assessments.
3. The National Association of Clean Water Agencies (NACWA) has worked with the Department of Homeland Security (DHS) and EPA to create a Chlorine Gas Decision Tool for Water and Wastewater Utilities. The Tool is designed to provide utilities with a user-friendly, but thorough, means of evaluating alternatives to chlorine gas disinfection.
4. EPA created a series of Security Product Guides that assist water facilities with making enhancements to reduce risks and protect against man-made and naturally occurring events. These guides provide recommendations for improving physical security, such as the use of barriers, placement and security of aboveground equipment, selection of fencing materials, and the

use of visual surveillance monitoring systems, all of which can help to secure hazardous chemicals used by water facilities.

5. We funded a cooperative agreement with the American Society of Civil Engineers, the American Water Works Association, and the Water Environmental Federation to develop Voluntary Physical Security Standards for drinking water and wastewater systems. Completed in December 2006, these voluntary standards address storage of hazardous or toxic chemicals, including chlorine and ammonia gas.
6. Together with the National Oceanic and Atmospheric Administration, EPA developed ALOHA (Aerial Locations of Hazardous Atmospheres) and RMP*Comp – software tools that many water utilities and other facilities use to model the dispersion of hazardous substances. DHS uses RMP*Comp in its Chemical Facilities Anti-Terrorism Standards (CFATS) program.

Risk Management Plans

In addition to the above activities, EPA's Chemical Accident Prevention Provisions (40 CFR 68.1 - .220), developed under the authority of the Clean Air Act, Section 112(r), require utility processes containing certain levels of specific hazardous substances to implement an accident prevention program, conduct a hazard assessment, prepare and implement an emergency response plan, and submit to EPA a summary report known as a risk management plan (RMP). The RMP must describe the facility's accidental release prevention and emergency response policies, the regulated substances handled at the facility, the worst-case release scenario(s) and alternative release scenario(s), the 5-year accident history of the facility, the Emergency Response Plan, and planned changes to improve safety at the facility (see 40 CFR Part 68). Hazardous chemicals of most relevance to the Water Sector, including gaseous chlorine, ammonia, sulfur dioxide, and chlorine dioxide, trigger RMP regulatory requirements if they exceed certain threshold quantities.

Considerations for Chemical Security in the Water Sector

It is important to note that the Administration has developed a set of guiding principles for the reauthorization of the Chemical Facility Anti-Terrorism Standards (CFATS) program and for addressing the chemical security of our nation's wastewater and drinking water treatment facilities. These principles are:

1) The Administration supports permanent chemical facility security authorities and a detailed and deliberate process for doing so, hence our preference for that process to be completed in FY10.

2) Nonetheless, CFATS single year reauthorization in this session presents an opportunity to promote the consideration and adoption of inherently safer technologies (IST) among high risk chemical facilities. We look forward to working with this Committee and others on this important matter.

3) CFATS reauthorization also presents an opportunity to close the existing security gap for wastewater and drinking water treatment facilities by addressing the statutory exemption of these facilities from CFATS. The Administration supports closing this gap.

As we have stated to Congress before, we believe that there is a critical gap in the U.S. chemical security regulatory framework—namely, the exemption of drinking water and wastewater treatment facilities. We need to work with Congress to close this gap in order to secure substances of concern at these facilities and to protect the communities they serve. Drinking water and wastewater treatment facilities that meet CFATS thresholds for chemicals of interest should be regulated. We do, however, recognize the unique public health and environmental requirements and responsibilities of such facilities. For example, we understand that a "cease operations" order that might be appropriate for another facility under CFATS would have significant public health and environmental consequences when applied to a water facility.

The Administration also has established the following policy principles in regards to regulating security at water sector facilities:

- EPA should be the lead agency for chemical security for both drinking water and wastewater systems, with DHS supporting EPA's efforts.

- To address chemical security in the water sector, EPA would utilize, with modifications as appropriate given statutory requirements and the uniqueness of the sector, DHS' existing risk assessment tools and performance standards for chemical facilities.

- DHS should be responsible for ensuring consistency of high-risk chemical facility security across all 18 critical infrastructure sectors.

- Where possible, we support using safer technology, such as less toxic chemicals, to enhance the security of the nation's high-risk chemical storing facilities. Facilities posing the highest degree of risk should be required to implement IST method(s) if such methods enhance overall security, are feasible, and consider public health and environmental requirements.

In addition to articulating these principles, I would like to present the Agency's view of the appropriate division of regulatory labor between EPA and the states. EPA supports legislative authority which would provide the states with an important role in regulating chemical security at water systems, including a prominent state role in IST determinations and auditing/inspections. This federal partnership with the states would leverage long established EPA-state relationships under the drinking water and wastewater programs, as well as the states' expertise and familiarity with individual water facilities.

CONCLUSION

Over the past several years, we have made progress in ensuring the security of our nation's drinking water and wastewater systems. We have produced a broad array of tools and assistance that the Water Sector is using to assess its vulnerabilities, reduce risk, and prepare for emergencies, including chemical theft and release. In developing these tools, we have worked effectively with our partners within the sector, and also reached out to build new relationships beyond the sector, to ensure that water utilities can be prepared to prevent, detect, respond to and recover from intentional incidents and natural disasters.

With respect to security at water sector facilities, we look forward to continuing to work with members of the Committee on legislation that ensures the security of drinking water and wastewater facilities while supporting the critical mission of these facilities for public health and environmental protection.

Thank you again for the opportunity to testify about our role in water security. I would be happy to answer any questions you may have.

TESTIMONY OF

DARIUS D. SIVIN, PHD

LEGISLATIVE REPRESENTATIVE

INTERNATIONAL UNION, UAW

on the subject of

CHEMICAL SECURITY: ASSESSING PROGRESS AND CHARTING A PATH FORWARD

before the

COMMITTEE ON HOMELAND SECURITY AND GOVERNMENT AFFAIRS

UNITED STATES SENATE

MARCH 3, 2010

Chairman Lieberman, Ranking Member Collins and Members of the Committee, I am Dr. Darius Sivin, a Legislative Representative for the International Union, United Automobile, Aerospace & Agricultural Implement Workers of America (UAW). The UAW represents over one million active and retired workers. I have been serving as a legislative representative for the UAW since November, 2007. Before that, I worked in the UAW Health and Safety Department as an industrial hygienist.

The UAW appreciates the opportunity to testify at this hearing on "Chemical Security: Assessing Progress and Charting a Path Forward." The UAW and more than 50 partners in a coalition of labor, public interest, public health and environmental organizations strongly believe that the existing Chemical Facility Anti-Terrorism Standard (CFATS) is inadequate. In our judgment, the path forward should be a comprehensive chemical security bill at least as strong as the legislation passed by the House last year, the "Chemical and Water Security Act of 2009" (H.R. 2868). We urge this Committee and the entire Senate to act promptly to approve such legislation.

Importance of Chemical Security

The Department of Homeland Security (DHS) has identified approximately 6,000 high risk U.S. chemical facilities and classified them into four tiers. This number does not include any drinking water or wastewater facilities, which are explicitly excluded from CFATS by its authorizing legislation. According to a 2009 Congressional Research Service review of Environmental Protection Agency (EPA) data[1], almost 100 U.S. chemical plants each put 1 million or more people at risk. Union members are concerned that their workplaces and communities are not adequately protected from deadly terrorist attacks on chemical facilities and drinking water systems. Employees are the ones who will get hurt first and worst in the case of an attack.

The UAW represents workers at more than 15 facilities that are required to file EPA risk management plans (RMPs), and are therefore potentially covered by chemical security legislation. These include a chemical manufacturer in Adrian, MI and a wastewater facility in Detroit, both of which use chlorine gas by the rail car. Because so many of our members live and work in the vulnerability zone of the Detroit wastewater facility, which includes over 2 million people, we take no comfort in the fact that Detroit has recently been a terrorist target. We are encouraged by the fact that eleven wastewater treatment facilities in Michigan have already converted from chlorine gas to ultraviolet light or liquid chlorine bleach. It is likely that the Detroit facility can do the same.

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[1] Shea DA (2009). Memorandum to Honorable Edward Markey Re: RMP Facilities in the United States as of December 2009. Washington DC: Congressional Research Service.

Other UAW-represented facilities that are required to file RMPs include:

- a pigment facility in St. Louis, MO where an attack could expose up to 88 thousand people to anhydrous ammonia:
- a brewery in Trenton, OH, where an attack could expose over nine thousand people to anhydrous ammonia: and
- a plumbing fixture manufacturer in Searcy, AR, where an attack could expose over 9, 500 people to anhydrous ammonia.

Water Facilities

The UAW believes that water facilities should be covered by chemical security legislation. In 2006, the Government Accountability Office reported that two thirds of large U.S. wastewater facilities use a disinfectant other than chlorine gas or plan to switch away from chlorine gas[2]. An April, 2007 report by The Center for American Progress (CAP) indicated that, between 1999 and 2007, at least six drinking water and 19 wastewater facilities that had previously used chlorine gas by the railcar switched to a less hazardous disinfectant, such as liquid bleach or ultraviolet light. As a result, about 26 million people in nearby communities and millions more along rail delivery routes were no longer threatened by chlorine gas from these facilities. CAP reported that the cost of converting from the use of chlorine gas was typically no more than $1.50 per ratepayer per year and often much less. According to the same report, 24 drinking water and 13 wastewater facilities still used rail shipments of chlorine gas, posing a potential danger to more than 25 million Americans living nearby, and millions more near railways that deliver the chlorine gas[3]. In our judgment, the low cost of conversion and the large number of people who would be protected by eliminating the possibility of chlorine gas releases argue strongly for the inclusion of drinking water and wastewater facilities in comprehensive chemical security legislation.

Extending CFATS is Inadequate: Comprehensive Legislation is Necessary

The UAW and more than 50 other labor, public interest, public health and environmental organizations have endorsed comprehensive chemical security legislation. We oppose a mere extension of the existing Chemical Facility Anti-Terrorism Standard (CFATS) for several reasons:

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[2] Government Accountability Office. (GAO, 2006). *Securing Wastewater Facilities: Utilities Have Made Important Upgrades, but Further improvements to Key System Components May be Limited by Costs and Other Constraints.* Washington DC: GAO http://www.gao.gov/new.items/d06390.pdf
(Accessed Feb 25,2010)

[3] Orum P. (2007). *Toxic Trains and the Terrorist Threat*
How Water Utilities Can Get Chlorine Gas Off the Rails and Out of American Communities. Washington DC: Center for American Progress.
http://www.americanprogress.org/issues/2007/04/chemical_security_report.html (Accessed Feb 25, 2010)

1. The authorizing statute (Public Law 109-295, Section 550) exempts more than 2500 water treatment facilities, some of which put major cities, such as Detroit, at risk. These facilities need to be covered.

2. Under Section 550, DHS may not disapprove a site security plan based on the presence or absence of a particular measure. This means that the Department cannot even require a facility to assess methods to reduce the consequences of an attack. It also would be very difficult for DHS to disapprove of a plan that indicates that a surveillance camera would be placed in a gaping hole in fence rather than fixing it. To disapprove of the plan, DHS would have to prove that the camera did not achieve the same level of "performance" as fixing the fence.

3. Although background checks are one of the CFATS performance standards, CFATS provides no redress procedure for an employee who poses no security risk, but who suffers an adverse employment decision due to erroneous or irrelevant information arising from a background check. In contrast, H.R. 2868 limits the kinds of information that could be used to justify an adverse employment decision. It also provides procedures for seeking redress if adverse decisions result from erroneous or irrelevant information.

4. Section 550 fails to recognize that the success of any government security program requires the public to have enough information to hold the government accountable. Excessive secrecy does not increase security. Instead, it simply provides cover for officials who may be failing to live up to their responsibilities. Although it would be dangerous to make public information concerning specific vulnerabilities of specific facilities, it is still important to provide the public with enough information to make an evaluation as to whether the government is adequately carrying out its duties. The strong information protection provisions of Section 550 are not adequately balanced with any obligations on the part of DHS to disclose what kinds of enforcement activity it is or is not engaging in. The impact on security of such a duty to disclose could only be beneficial.

It has been argued that, despite its flaws, CFATS should not be replaced by comprehensive chemical security legislation because this supposedly would force facilities to redo work they had already done or strand investments they had already made. This argument simply ignores the fact that H.R. 2868 was intentionally written to build seamlessly on the existing CFATS standard. The House bill adds some requirements to the existing standard, but it does not change the form or substance of compliance. Work that has already been done to comply with the existing standard will not have to be redone. Marty Durbin, Vice President for Federal Affairs of the American Chemistry Council (ACC) acknowledged this in his congressional testimony of October 1, 2009, when he stated:

> We're pleased to see the legislation reflect many of the security measures that will be implemented under CFATS, and we appreciate the efforts made to minimize duplication of effort by facilities that have already acted or will take further action under the program[4].

Thus, the UAW believes that passage by the Senate of a bill similar to H.R. 2868 would provide continuity and permanence to the CFATS program. It would not be disruptive.

The UAW and our coalition partners support comprehensive chemical security legislation at least as strong as H.R. 2868 that would fix the problems we have identified with CFATS. Such legislation should:

- Cover water facilities;
- Require assessments of methods to reduce the consequences of an attack at all tiered facilities, and allow DHS to require implementation of such methods, under specific conditions, at the highest risk facilities, while providing funding for implementation;
- Provide for employee training in chemical security and allow for participation by employees and their representatives in facility inspections and in the development and implementation of security vulnerability assessments and site security plans; and
- Provide citizens with enough information to determine whether the government is adequately protecting their security and provide citizens with procedures for holding the government accountable.

Process that led to passage of H.R. 2868

The UAW and our coalition partners welcomed the passage of H.R. 2868 as a compromise measure that would improve protection for our members and their families and communities. I would like to thank the American Chemistry Council (ACC) for the constructive role it played in the passage of that bill. The ACC's spirit of compromise was reflected in both congressional testimony and in a letter to Chairman Waxman. On October 1, 2009, Marty Durbin, Vice President for

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[4] Durbin M. (2009). *Statement of Marty Durbin Vice President, Federal Affairs American Chemistry Council before the United States House of Representatives Energy and Commerce Subcommittee on Energy and the Environment Legislative Hearing on H.R. 2868 "The Chemical Facility Antiterrorism Act of 2009"* http://energycommerce.house.gov/Press_111/20091001/durbin_testimony.pdf (Accessed Feb 25, 2010)

Federal Affairs of the ACC, stated the following to the House Committee on Energy and Commerce:

> I would like to acknowledge the willingness of this committee to seek our input, and both to consider and understand our viewpoint. We have had constructive discussions that I hope will continue as we work together and the legislation progresses...[5]

In a letter to Chairman Waxman, dated October 20, 2009, Cal Dooley, President and CEO of the ACC, stated: "The Chemical Facility Anti-Terrorism Act of 2009, HR 2868, is the appropriate vehicle for ensuring a permanent CFATS program." He further stated: "the manager's amendment reflects several months of serious, constructive dialog that has, I believe, resulted in important improvements to H.R. 2868." He went on to praise changes that made the bill more to ACC's liking in the areas of employee participation and training, inspections, harmonization of the Maritime Transportation Security Act (MTSA) with CFATS and civil suits. The UAW and our coalition partners were pleased with the spirit of compromise shown by the ACC in the process that led to the passage of the H.R. 2868. In that spirit of compromise, we endorsed the bill even though it did not include everything we would have liked in government accountability, implementation of methods to reduce the consequences of an attack and worker protections. We look forward to working with the ACC in that same spirit of compromise as chemical security legislation is considered by the Senate.

Protecting Jobs

The UAW is confident that that there is no threat to jobs from the provisions in H.R. 2868 that provide for implementation, under specified conditions, of a facility's own proposed methods to reduce the potential consequences of a terrorist attack. A European study of a broader category of technological changes that includes safer and more secure technologies found that these changes had no significant impact on employment. The *San Francisco Chronicle* reported that Clorox plans to switch from chlorine gas to high strength bleach in its household bleach manufacturing process in seven U.S. facilities. The company expects no impact on jobs[6]. A Schweitzer-Mauduit paper mill in New Jersey converted from using rail cars of chlorine gas to generating chlorine dioxide on site. No jobs were lost as a result of this conversion[7]. In contrast, jobs can be lost when disasters strike facilities, whether intentionally or unintentionally caused. On July 7, 2009 the Delco Times, a Philadelphia area newspaper, reported that 40-50 jobs will be lost because Sunoco has decided not to rebuild an ethylene unit that was damaged in an explosion that took place on May 17, 2009[8].

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[5] *Ibid.*

[6] Brown S. (2009) "Clorox to make changes at bleach plants." *San Francisco Chronicle*. http://sanfrancisco.bizjournals.com/sanfrancisco/stories/2009/11/02/daily17.html (Accessed Feb 25, 21010)

[7] Patel D Engler R and Coyle D. (2008). *Still at Risk: Protecting New Jersey Jobs, Families, and Hometowns From Toxic Chemical Disasters.* Trenton: New Jersey Work Environment Council. http://www. niwec.org/PDF /Sti1I%20at<lIo20Risk%20Repo~10200ct<l/o2008.pdf

If there are exceptional cases in which implementation of methods to reduce the consequences of an attack would threaten jobs at a particular facility, the language in H.R. 2868 prevents implementation. An October 30, 2009 letter to the House, signed by the UAW and five other unions, including the United Steelworkers, who represent more chemical workers than any other union, and the International Chemical Workers Union Council, states the following:

> In our judgment, the legislation adequately protects jobs by requiring DHS to show that implementation of security plans "would not significantly and demonstrably impair the ability of the owner or operator of the covered chemical facility to continue the business of the facility at its location.

Moreover, the implementation provisions of the bill apply to only a small number of facilities, all of which have the opportunity to appeal. A November 5, 2009 letter urging Representatives to vote for final passage of H.R. 2868 without weakening amendments was signed by Louisiana Congressman Charlie Melancon and four of his colleagues from the Blue Dog Coalition. That letter says:

> DHS has estimated that these provisions will apply to less than 3 percent of all facilities under the regulations, or about 100-200 facilities. The legislation also provides a robust technical appeals process for chemical facilities that disagree with this determination. The Energy and Commerce Committee developed this provision using considerable input from the largest chemical industry association, the American Chemistry Council.

In conclusion, the UAW believes that now is the time to ensure the security of our chemical and water facilities, as well as that of the Americans who work in them and live near them. The existing CFATS regulations are inadequate. It is imperative that Congress move forward on true chemical and water security. We strongly urge this Committee and the entire Senate to approve a support comprehensive chemical security bill at least as strong as H.R. 2868. We look forward to working with the Members of this Committee on this important issue. Thank you.

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[8] http://www.delcotimes.com/articles/2009/07 /07/opinion/doc4a5328eat27dd959040 181.txt (Accessed July 20, 2009)

Statement of

Timothy J. Scott

Chief Security Officer & Corporate Director, Emergency Services & Security

The Dow Chemical Company

on behalf of The Dow Chemical Company and the American Chemistry Council

before the

United States Senate
Committee on Homeland Security and Governmental Affairs

Legislative Hearing on "Chemical Security: Assessing Progress and Charting a Path Forward"

March 3, 2010

1. Security is one of the Chemical Industry's Top Priorities

The American Chemistry Council (ACC) represents the leading chemical companies in the United States who produce the essential products critical to everyday life. The business of chemistry is a critical aspect of our nation's economy; employing more than 800,000 Americans and producing more than 19 percent of the world's chemical products. In fact, more than 96% of all manufactured goods are directly touched by the business of chemistry. ACC members provide the chemistry used to produce life saving medications and medical devices; the body armor used by our men and women in the military and law enforcement; the light weight components for vehicles that help improve gas mileage; the energy saving building insulation and windows; silicon for solar panels and the durable, and light weight wind turbine blades that help provide green energy to name but a few.

Because of our critical role in the economy and our responsibility to our communities, security continues to be a top priority for ACC members. In 2001, our members voluntarily adopted an aggressive security program that became the Responsible Care® Security Code (RCSC). Responsible Care implementation is mandatory for all members of the ACC and is regularly reviewed by independent, credentialed third-party auditors. The RCSC is a comprehensive security program that addresses both physical and cyber security vulnerabilities, which requires ACC members to perform a comprehensive assessment of its security risks and to implement appropriate protective measures throughout a company's value chain. The RCSC has been a model for state-level chemical security regulatory programs in New Jersey, New York and Maryland and was deemed equivalent to the U. S. Coast Guard's Maritime Transportation Security Act (MTSA). To date, ACC members have invested over $8 billion dollars in security enhancements under the auspices of the RCSC and in compliance with CFATS.

2. DHS and Industry Have Made Significant Progress Toward Increased Chemical Facility Security.

On April 9, 2007 the U. S. Department of Homeland Security published the "Chemical Facilities Anti-terrorism Standards," (CFATS). This comprehensive Federal regulatory program requires high-risk chemical facilities to register with DHS (Top Screen), conduct a thorough site security assessment and implement protective measures that comply with 18 risk based performance standards (RBPS). The RBPSs identify the specific areas for which a covered facility's security posture will be examined such as perimeter security, access control, personnel surety and cyber. To meet the RBPSs, covered facilities can select security programs or processes they deem appropriate for their site-specific circumstances so long as they achieve the requisite level of performance in each area.

Since CFATS became effective in June 2007, DHS has reviewed nearly 38,000 Top-Screen submissions and has notified more than 7,000 facilities of their high-risk designations and preliminary tiers. As a result, the number of high risk chemical facilities has been reduced by nearly 1000 facilities. According to DHS, this reduction has been due largely to the voluntary material modifications that have lowered or even eliminated the use and storage of hazardous chemicals onsite, thus lowering their risk profile and increasing the safety to our communities. This clearly demonstrates that CFATS is working and should be fully supported.

Of those remaining, DHS has assigned final tiers to 3507 facilities including 225 Tier 1 sites, 515 Tier 2 sites, 1064 Tier 3 sites and 1703 Tier 4 sites. Each of these sites is in the process of reviewing their site security plans. DHS inspectors have begun to conduct preliminary inspections of Tier 1 facilities. And DHS will begin the first wave of compliance inspections in the first quarter of 2010. These inspections are designed to verify that facilities are doing what they said they would do and that the protective measures meet the established performance level commensurate with their level of risk.

For ACC members, this is exactly what a strong regulatory approach must do - ***set a high bar through performance-based standards and then hold facilities accountable.*** The approach taken by CFATS allows facilities to utilize a full range of potential security enhancements depending on local site conditions and risk thus maximizing their potential effectiveness.

CFATS is a robust, comprehensive and demanding chemical security regulatory program. It will require significant additional investment from ACC member company facilities deemed "high risk."

3. Congress Must Provide DHS with Sufficient Resources to Protect Chemical Facilities and Make CFATS Permanent

DHS staff has demonstrated outstanding commitment and effort to effectively and expeditiously implement the current CFATS program. ACC urges Congress to continue to provide the agency with the necessary resources to handle the workload and to ensure that chemical facility security is properly implemented in a timely manner. We were therefore pleased to see that Congress approved the DHS 2010 budget request and provided a one-year extension for CFATS to November 2010. While this extension is helpful, we encourage Congress to provide permanence to the CFATS program, ensuring certainty and providing stability so the industry can continue to move forward making security investments.

4. ACC Supports Effective Chemical Facility Security Regulations.

On February 4th, Senator Collins (R-Me) introduced a bipartisan bill to extend the current CFATS regulations for five years. Titled "Continuing Chemical Facilities Antiterrorism Security Act of 2010", S. 2996 would give DHS sufficient time to fully implement standards that it developed in 2007. ACC supports that objective and this bi-partisan legislation. S.2996 will go a long way to provide certainty and to ensure that this country continues to benefit from the security measures in place, while recognizing the significant efforts currently underway.

Under the current CFATS program thousands of facilities across the U. S. are taking significant steps to secure their sites against a terrorist attack. DHS and industry are working diligently to implement CFATS as effectively and as fast as possible. DHS personnel have conducted reviews of site-specific vulnerability information and are assisting facilities as they develop site security plans. DHS is in the process of visiting the regulated sites to review and approve their security plans. This will include assessing how each facility has addressed the applicable risk based performance standards which is a complex, site-specific, evaluation.

5. Inherently Safer Technologies

We believe that it is unnecessary and inadvisable for Congress to provide DHS the authority to mandate prescriptive chemical process changes by including an IST provision within the CFATS regulatory program. Through the use of Risk Based Performance Standards, CFATS has demonstrated that it drives facilities to consider all possible risk-reduction options, including inherently safer approaches, when developing a site security plan. The highest risk facilities subject to CFATS face significant capital investments to implement enhancements, thus providing the incentive for the facility to consider all such risk reduction options in order to move into a lower risk based tier, or potentially out of the program. While you can't mandate innovation, CFATS already provides the incentives to unleash the ingenuity, expertise and resources of the chemical industry. Congress should not abandon a strategy that employs performance-based security standards that recognizes the need for site-specific solutions and that holds facilities accountable, while avoiding the potential for risk shifting.

6. Should water systems be covered under CFATS?

Safety and security should be a top priority for every facility that produces stores or uses chemicals. If Congress expands the sectors covered by either CFATS or a separate initiative, ACC believes that the regulatory approach should be consistent across sectors. Security programs should be performance-based and implemented to address the specific needs and circumstances of each individual facility. The use of chlorine to help provide safe drinking water is widely recognized as one of the most important public health advances in history. In the early 20th century, tens of thousands people died each year of water-borne diseases such as cholera and typhoid fever. Drinking water chlorination and filtration have helped to virtually eliminate these diseases in the U.S. As with other applications of chemistry, any security standards for the water sector must focus on reducing overall security risks without compromising the essential services that these facilities provide.

In Conclusion

We agree that our shared priority is to enhance security at chemical sites nationwide. ACC members have invested $8 billion in security enhancements including both physical and cyber security protections through the RCSC and the chemical industry are covered by the one of most comprehensive Federal regulatory programs in existence. The members of ACC and the chemical industry are committed to continuing an aggressive approach to safeguarding America's chemical facilities. It is in this spirit, we are offering our assistance to continue to work with the DHS and members of Congress in support of our shared mission.

SOCMA
Society of Chemical Manufacturers & Affiliates

Testimony of Stephen Poorman
International EHS Manager
FUJIFILM Imaging Colorants Ltd.

on behalf of the
Society of Chemical Manufacturers and Affiliates

before the

Senate Committee on Homeland Security and Governmental Affairs

on
Chemical Security: Assessing Progress and Charting a Path Forward

March 3, 2010

Good morning, Chairman Lieberman, Ranking Member Collins, and members of the Committee. My name is Stephen Poorman, and I am the International Environment, Health & Safety Manager for FUJIFILM Imaging Colorants Ltd. I am pleased to provide this testimony regarding the Chemical Facility Anti-Terrorism Acts Standards (CFATS). I speak before you today on behalf of the Society of Chemical Manufacturers and Affiliates (SOCMA), of which FUJIFILM is a member.

Less than four years ago, and working in a bipartisan manner, Congress enacted a strong chemical security regulatory program. It was this committee's sustained effort over two years that drove that legislation. Thanks to the bipartisan leadership shown by your committee, the U.S. Department of Homeland Security (DHS) and regulated facilities are deep in the middle of implementing this vital program in a focused, cooperative manner. We urge you not to upset – and further delay – this important process by sending DHS and regulated facilities back to the drawing board.

SOCMA strongly supports DHS's current CFATS program. This demanding program is now requiring over six thousand chemical facilities nationwide to develop and deploy meaningful security enhancements. It protects facilities against attack without impairing the industry's ability to remain innovative and maintains some of the nation's highest paid jobs in the manufacturing sector.

Congress can best assure the CFATS's program's success and forward momentum by passing S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act of 2010, recently introduced by Ranking Member Collins, together with Senators Pryor, Voinovich, and Landrieu. This bill would reauthorize the CFATS program until 2015, thus allowing DHS and facilities to remain focused on successfully implementing that program as quickly as possible.

The House has taken a very different approach than the Senate so far to address the future of CFATS. First, it approved largely a partisan bill (H.R. 2868) with no support from the minority -- not a single vote in favor. That bill includes provisions that are fundamentally unwise and potentially counterproductive to our shared goal of preventing terrorist incidents at chemical facilities. The House bill was approved despite testimony from numerous witnesses who shared strong concerns regarding these provisions. After sharing with you what steps SOCMA and its members have taken before and within the CFATS program, I will explain why we support S. 2996 and why we respectfully, but strongly, oppose any mandate that facilities implement so-called inherently safer technology ("IST").

Despite what you will hear today about how the House's version of mandatory IST would not impact jobs, I ask that you take seriously our concerns about job impacts. As the voice of many small and large chemical manufacturers that employ thousands of employees in key manufacturing states such as Connecticut, Michigan, Arkansas, Delaware, and Missouri, we stand to lose greatly. It is a wonder why IST proponents still support such a provision when there is so much uncertainty about the concept and how DHS could apply it -- and during a historic economic recession in which our nation's unemployment rate still stands at nearly 10%.

I. SOCMA and the Current State of Chemical Facility Security

A. SOCMA

SOCMA is the leading trade association representing the batch, custom and specialty chemical industry. SOCMA's nearly 300 member companies employ more than 100,000 workers across the country and produce some 50,000 products – valued at $60 billion annually – that make our standard of living possible. From pharmaceuticals to cosmetics, soaps to plastics and all manner of industrial and construction products, SOCMA members make materials that save lives, make our food supply safe and abundant, and enable the manufacture of literally thousands of other products. Over 80% of SOCMA's active members are small businesses.

ChemStewards® is SOCMA's flagship environmental, health, safety and security (EHS&S) continuous performance improvement program. It was created to meet the unique needs of the batch, custom, and specialty chemical industry, and reflects the industry's commitment to reducing the environmental footprint left by members' facilities. As a mandatory requirement for SOCMA members engaged in the manufacturing or handling of synthetic and organic chemicals, ChemStewards is helping participants reach for superior EHS&S performance.

B. SOCMA's Security Achievements to Date

Maintaining the security of our facilities has always been a priority for SOCMA members, and was so before September 11. After the tragic events of 9/11, SOCMA members did not wait for new government regulations before researching, investing in and implementing additional and far-reaching facility security measures to address these new threats. Under the ChemStewards initiative, SOCMA members were required to conduct security vulnerability assessments (SVAs) and to implement security measures.

SOCMA designed an SVA methodology specifically for batch, custom and specialty chemical facilities that was approved by the Center for Chemical Process Safety (CCPS) as meeting its requirements for an effective methodology. SOCMA members have spent billions of dollars and have devoted countless man-hours to secure their facilities and operations. These investments will naturally continue for the foreseeable future.

Many (though by no means all) SOCMA member company facilities are encompassed by the CFATS program. These facilities have completed and submitted their Top-Screens and SVAs and, as notified by DHS, have initiated or completed their Site Security Plans (SSPs).

These plants are implementing additional required security measures and are being (or will soon be) inspected by DHS to verify the adequacy of those plans and their conformance to them. Many of our member companies' other facilities comply with the Coast Guard's facility security requirements under the Maritime Transportation Security Act (MTSA).

Looking well beyond regulatory requirements, our members have also partnered with DHS on many important voluntary security initiatives and programs, including the Risk Assessment

Methodology for Critical Asset Protection (RAMCAP), the Buffer Zone Protection Plans, and the Homeland Security Information Network (HSIN). SOCMA is a founding member of the Chemical Sector Coordinating Council, which has served as a model for how critical infrastructure sectors should work together and with DHS.

Through these councils and other avenues, we and our members have developed close and open working relationships with DHS and other federal agencies, and with state and local governments, to exchange information and coordinate roles in maintaining the security of our critical chemical facility infrastructure. These actions have included holding joint training exercises and conducting annual security conferences that involve federal and state government officials with security expertise. Industry personnel from the largest companies to the smallest have shared best practices at association meetings and conferences.

C. Preserving the Progress under CFATS

While we will leave a detailed progress report on the CFATS program to DHS, SOCMA wants to emphasize that we regard the program thus far as a success. Almost 40,000 facilities have submitted Top-Screens, close to 7,000 have completed SVAs, and DHS has now requested SSPs from facilities in all four tiers of the program, including the great majority of Tiers 1-3. Top tier SSPs have undergone reviewed and inspections are now starting. Of perhaps greatest interest to many members of this panel, we understand that more than 1000 facilities – roughly 15 percent of the preliminarily tiered facilities- have changed processes or inventories in ways that have enabled them to screen out of the program. Thus, as predicted, CFATS is driving facilities to reduce inherent hazards, where doing so is in fact safer, does not transfer risk to some other point in the supply chain, and makes economic sense.

To fully gauge the effectiveness of the CFATS program, Congress should allow it to be fully implemented – for all tiered facilities to fully comply (or be brought into compliance). Thus, Congress should reauthorize the underlying statute for another five years – as S. 2996 would do – or simply make the current program permanent.

The House-approved bill, H.R. 2868, would jeopardize the progress that industry and DHS have made together under CFATS. The bill's requirement of mandatory implementation of IST would shift DHS's focus from securing our industry against terrorism to conducting engineering and chemistry assessments, while potentially phasing out legitimate products that improve our daily lives and enhance our safety.

II. SOCMA supports S. 2996

SOCMA strongly supports S. 2996. It will reauthorize the CFATS program until 2015, thus allowing DHS and facilities to remain focused on successfully implementing that program as quickly as possible.

SOCMA is also generally supportive of the bill's provisions to create voluntary chemical security training and exercise programs. Properly executed, such programs would enhance the capabilities of high-risk chemicals faculties to prevent, prepare and respond to acts of terrorism.

Similar to provisions in the SAFE Ports Act, these features of the bill would create valuable solutions to protect our nation's critical infrastructure from a terrorist attack. Training and exercise programs would support a collaborative environment, involving federal, state, and local governments, facilities, and public and private universities, all dedicated to achieving the goals set forth in the National Infrastructure Protection Plan.

SOCMA does encourage the Committee to clarify three provisions of the bill:

- The language addressing both the training and exercise programs calls for an evaluation "against clear and consistent performance measures." It is not evident, however, what sorts of performance measures are envisioned. Further guidance, either in bill or report language, would assist DHS and others in understanding Congress's intent.
- The language regarding training calls for it to "[a]ddress[] security requirements under chemical facility security plans." Chemical facility site security plans are protected Chemical–terrorism Vulnerability Information, which should not be disclosed to the public. Any training would need to ensure that such information is not compromised. An alternative formulation might be to call for training to enable facility personnel to assure attainment of applicable Risk-Based Performance Standards. A publically-available DHS guidance document provides additional detail on these standards.
- Finally, we ask the Committee to consider further the requirement of training programs to "individuals in neighborhoods around chemical facilities on how to observe and report security risks." Again, it will be important that this training not create protected information problems.

III. Mandatory IST Is an Inherently Risky Proposition

As established by H.R. 2868, Section 2111 of the CFATS statute would require Tier 1 and 2 facilities to implement "methods to reduce the consequences of a terrorist attack" –i.e., IST – whenever DHS made specified findings about risk reduction and technical and economic feasibility. However common sense such a mandate might appear on the surface, it is fundamentally a bad idea in the security context. Inherent safety is a superficially simple but truthfully very complex concept, and one that is inherently unsuited to regulation. Any IST mandate is bound to create situations that will *actually increase or transfer overall risks*. It would also wreak economic havoc on regulated facilities, notwithstanding the findings DHS would have to make. Makers of active pharmaceutical ingredients, common fuels and other federally-regulated substances would be most at risk of such economic damage.

A. What Inherent Safety Really Is and Why Mandating It Is Not Inherently Better

First and foremost, it is important to clarify a common misunderstanding about inherent safety. Quite simply, IST is a process-related engineering concept, not a security one. It is premised on the belief that, if a particular chemical process hazard can be reduced, the overall risk associated with that process will also be reduced. In its simplicity, it is an elegant concept, but the reality is almost never that simple. A reduction in hazard will reduce overall risk if, and only if, that hazard is not displaced to another time or location, or result in the creation of some new hazard.

Inherent safety is only successful if the sum total of all risks associated with a process life cycle is reduced. This is rarely a simple calculation, and to some extent it is an irreducibly subjective one (for example, a substitute chemical that may reduce explosion risks may also pose chronic health risks).

The calculation becomes even more difficult when it is being done not solely for reasons of process safety (where accident probabilities can be estimated with some degree of confidence) but also for reasons of security (where the probability of terrorist attack is highly uncertain but certainly low). There is no agreed-upon methodology to measure whether one process is inherently safer than another process – something DHS's Science & Technology Directorate is attempting to address -- in a multi-million dollar, multi-year process that may or may not succeed. This is why the world's foremost experts in IST and chemical engineering consistently recommend against regulating inherent safety for security purposes.

Here are several examples of how difficult it can be to reduce overall risk when attempting to reduce hazard:

Eliminating the use of a hazardous catalyst

A chemical company wants to eliminate the use of a hazardous catalyst, which is typically used in small amounts. The catalyst serves as a booster to start a chemical reaction to make a building block for a drug used to treat cancer. Catalysts tend to be hazardous by nature, which reduces the number of available alternatives. The only way the company can initiate the reaction without using a hazardous catalyst is to increase the temperature and pressure of the system. The overall risk of the new system, aggravated by increasing the temperature and pressure, may actually be greater than the risk associated with use of the catalyst, because catalysts are typically used in small amounts and the likelihood of an accident is remote.

Reducing the amount of a chemical stored on site

A manufacturing plant is considering a reduction in the volume of a particular chemical stored on site. The chemical is used to manufacture a critical nylon additive, which is sold to another company and used to make seat belts stronger. Because it is a critical component for nylon strength and seatbelt production cannot be disrupted, the production schedule cannot change. If the amount stored on site is reduced, the only way to maintain the production schedule is to increase the number of shipments to the site. This leads to more deliveries (an increase in transportation risk) and more transfers of chemical from one container to another (an increase in transfer risk). Economic risks are also increased since there is now a greater chance that production could be disrupted by a late shipment.

How location and individual circumstance affect risk perception

It is difficult to describe a scenario in which moving a hazard does not result in a simple transfer of risk from one location to another. For example, location can highlight different risk perspectives, such as the use of chlorine, a hazardous gas that comes in various types of containers. A commonly used example compares the inherent safety of a rail car, which typically holds up to 90 tons, versus storage in one-ton cylinders. Residents near the facility would probably view the one-ton cylinder as inherently safer than a rail car.

On the other hand, workers who have to connect and disconnect the cylinders 90 times, instead of just once for the rail car, would probably consider the rail car inherently safer.

B. IST's Impact on Pharmaceuticals and Microelectronics

One of SOCMA's greatest concerns with Section 2111 is the real possibility that it will negatively restrict the production of active pharmaceutical ingredients (APIs), many of the key raw materials of which are included on DHS's Appendix A of covered chemicals.
APIs are used in prescription and generic drugs, life saving vaccines and over-the-counter medicines. They are thoroughly regulated by the FDA and must meet demanding quality and purity requirements. Substituting chemicals or processes used for the production of APIs would likely violate the conditions of their FDA approvals. Requiring IST could delay clinical trials while new replacement chemicals are identified or invented, and would force API manufacturers and their customer drug manufacturers to reapply for FDA approval of their products because of the significant change in the manufacturing.

The lengthy 1 - 4 year approval timeline for a new or equivalent replacement chemical would be a high price to pay for American consumers, many of whom rely on ready access to pharmaceuticals. To meet continuing consumer demand, API production would likely shift to foreign countries, where the FDA is less able to monitor conformance to quality standards.

Many SOCMA members' products are also vital to the manufacture of microelectronics.
Below, we offer several examples, provided by SOCMA members, of how IST could cripple the pharmaceutical and microelectronics industries.

Lifesaving Antibiotics: Company A
Company A is a minority-owned small business regulated by DHS under CFATS. It produces an active pharmaceutical ingredient critical to specific antibiotics used in the treatment of a life-threatening bacterial infection. For this purpose, the company is also regulated by the FDA. Since the product's specifications are likely not to be attainable via any chemical substitution or altered process, if a "safer" manufacturing process alternative was mandated, the company would likely be forced to discontinue production, lay off workers and increase our nation's vulnerability to bacteriological threats. The impact of a mandatory alternative would thus be swift and direct.

Common Pain Reliever: Company B
Company B manufactures the active pharmaceutical ingredient Ibuprofen. Ibuprofen is a non-steroidal anti-inflammatory drug (NSAID) used to treat pain and relieves symptoms of arthritis such as inflammation, swelling, stiffness, and joint pain. It is one of the world's most successful and widely-used pain relievers, and is listed on the World Health Organization's model list of medicines.[1] Changing the raw materials, and consequently the process, used to manufacture it presents a risk to public health and a substantial cost for re-qualification from a technical, regulatory, and potentially clinical perspective.

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[1] World Health Organization, *WHO Model List of Essential Medicines* (March 2005).

Company B's 31-year old process to manufacture Ibuprofen bulk active is well characterized and controlled, and consistently makes a safe and efficacious product. The process-characteristic impurity profile, specified under the prevailing USP and European Pharmacopoeia compendia, is proven to have no impact to public health by its use by millions of people worldwide. The costs derived from IST, if it impaired production quantities or product quality, would ultimately be felt by consumers.

Microelectronics: Company C

Company C manufactures two Appendix A chemicals of interest targeted by industry critics. First, Company C uses small amounts of hydrochloric acid (HCl) in a very high purity, aqueous form (37%) to manufacture a product that represents almost half of the company's revenue worldwide (~$30 million/yr). The product is used in the microelectronics industry to manufacture integrated circuits and LCD displays. If HCl were not available, Company C would be unable to make its largest product, resulting in at least a 50% reduction in workforce, which would equate to losing 60 jobs. If the company chose to continue the business, alternatives would have to be developed and implemented to continue manufacture of those products, which could easily require billions of dollars of research, development and implementation, resources that small companies like Company C, which include many of SOCMA's members, do not have. Additionally, Company C uses HCl to protect the environment: its use brings the pH of the company's wastewater into the range dictated by its wastewater permit.

The company also uses small volume products using aqueous (49%) hydrofluoric acid (HF) that are sold into the microelectronics industry. Customers of Company C that need HF for their products require Company C to undergo specific certification standards as a product supplier. If Company C was forced to use a substitute, it would immediately be out of compliance with its customers' product standards, which (obviously) would negatively impact Company C's business. In some cases, the HF is being used as a safer alternative to replace hydroxylamine (HA), the use of which has been reduced due to the multiple explosions at HA manufacturing facilities. In some cases, anhydrous HF may be necessary as water may be incompatible with the manufacturing process. If manufacturers of microelectronics were denied a supply of HF, there would be a negative consequence to the domestic manufacture of integrated circuits and LCD displays.

SOCMA is aware that the Energy & Commerce Committee's report on H.R. 2996 opined that, where mandated IST "could result in a product that is less effective or less available to those who need it," or "forced the company to seek new regulatory approvals (such as from the Food and Drug Administration) that could take years to obtain, that could mean that the covered facility could not continue its business" and "the Department must consider such unintended consequences."[2] Respectfully, SOCMA's concerns are not alleviated by such non-binding language. Not only would DHS not be required to follow it, but DHS would also be free to conclude that the amount of delay required to get an FDA approval, or the degree to which the effectiveness of a product would be diminished, would *not* mean that the facility could not continue its business. After all, a sufficient large and flexible facility might well be able to stay in business even though it has lost an important product or market. But this Committee should not be encouraging the destruction of products and markets, for questionable benefits, in this economy (or any other).

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[2] H.R. Rep. No. 111-205, pt. 2, at 48 (Oct. 23, 2009).

C. IST's Impact on Jobs

It goes without saying that process or product changes will have a negative impact on the jobs at facilities forced to make these changes. There are multiple pressures on SOCMA's members, not just whether there is a market that can afford to purchase what they produce or whether they can compete with the lower wages and resource costs in foreign countries. Chemical manufacturers are required to comply with many state, local, and federal regulations. Regulatory requirements cost money, money that is used to hire workers, train them, to innovate, develop new products and to provide healthcare to them. The chemical industry is one of the most regulated industries in the United States. Spending money to comply with new regulations necessarily causes companies to assess how they will pay for it. There isn't much available capital these days for manufacturers to take on new regulations aimed at their very livelihood, especially small manufacturers.

Because they lack the economies of scale and resources of larger companies, small businesses will be the most vulnerable to the IST provisions of the House bill. The unintended consequences of this provision will not only affect chemical manufacturers, but also resonate throughout their value chain. Since the economic downturn, small businesses have been hit hard by the economic recession. While producer prices have risen at an annualized rate of 8.3 percent, consumer prices have barely moved (only rising an annualized 1.3 percent), suggesting that firms have been unable to pass along higher costs to their customers. Meanwhile, unemployment remains high, ending the year at 10 percent. The United States economy has lost 310,000 net jobs during the last quarter, on top of the 4.8 million lost during 2009. States in which chemical manufacturing is concentrated represent some of the hardest hit areas. For example, Michigan's unemployment rate at the end of 2009 was 14.6%, the highest in the nation. SOCMA has several manufacturing members in Michigan, most of which are small companies but which pay competitive wages. Missouri is not far behind at 9.6%, Delaware at 9.0%, and Connecticut at 8.9%.[3] SOCMA members from most of these states have written to their Members of Congress, asking you to support the current CFATS program and oppose mandatory IST requirements.

D. Experts Agree IST Should Not Be Mandated

As these examples demonstrate, a "simple" reduction in hazard may not necessarily result in a reduction of overall risk, and a poorly constructed or incomplete analysis could result in a "safer" alternative producing more harm than good. That is why government agencies and experts who really understand inherent safety have consistently opposed giving government the power to mandate it. This includes:

- Neal Langerman, representing the American Chemical Society – the majority's own technical witness at the Homeland Security Committee hearing last June.[4]

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[3] U.S. Bureau of Labor Statistics, December 2009.

- Sam Mannan, Director of the Mary Kay O'Connor Process Safety Center at Texas A&M University, in testimony before the Homeland Security Committee on December 12, 2007.[5]

- Dennis Hendershot, testifying on behalf of the Center for Chemical Process Safety before the Senate Environment & Public Works Committee on June 21, 2006.[6]

It is likewise instructive that the state of New Jersey, whose chemical facility security program is regularly contrasted with the CFATS program, only requires consideration of IST – *it does not require facilities to implement it.* It is even more telling that H.R. 2868 avoids the politically

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[4] *See* http://homeland.house.gov/SiteDocuments/20090616103505-95857.pdf, page 7:

> In conclusion, the existing regulatory structure, under the U.S. EPA Risk Management program and the U.S. OSHA Process Safety Management standard, provide strong incentives to examine and implement IST. These programs work in natural conjunction with Homeland Security's mandate to enhance infrastructure security. The provisions of the Chemical Facility Antiterrorism Act of 2006 provide a sufficient legislative framework for this purpose. The most effective steps to further infrastructure protections will likely include incentives, rather than new regulations.

[5] Go to http://homeland.house.gov/Hearings/index.asp?ID=108, click on "Dr. Mannan's testimony," pp. 6-7:

> [I]n developing inherently safer technologies, there are significant technical challenges that require research and development efforts. These challenges make regulation of inherent safety very difficult. . . . Instead of prescriptive requirements for inherently safer technology and approaches, facilities should be allowed the flexibility of achieving a manageable level of risk using a combination of safety and security options. . . . Over the past 10-15 years, and more so after 9/11, consideration of Inherently Safer Technology (IST) options and approaches has effectively become part of industry standards, with the experts and persons with know-how assessing and implementing inherently safer options, without prescriptive regulations that carry risks (both as trumping other tools or potentially shifting risk). A better approach for applying IST in security is by allowing the companies to assess IST as part of their overall safety, security and environmental operations and therefore, cannot be prescriptive.

[6] *See* http://epw.senate.gov/109th/Hendershot_Testimony.pdf, at 4-8, esp. 5-6:

> There are tens of thousands of chemical products manufactured, most of them by unique and specialized processes. The real experts on these technologies, and on the hazards associated with the technology, are the people who invent the processes and run the plants. In many cases they have spent entire careers understanding the chemistry, hazards, and processes. They are in the best position to understand the best choices, rather than a regulator or bureaucrat with, at best, a passing knowledge of the technology

sensitive question of whether to require public drinking water systems and publicly-owned wastewater treatment works to implement IST by deferring the decision to EPA and the states.[7] Congress should not require DHS to do what all these experts have concluded is unwise, and what it is unwilling to do directly when the public is picking up the tab.

E. Conditioning the IST Mandate Does Not Solve the Problem

SOCMA is aware that the House bill would only allow DHS to impose mandatory on Tier 1 and 2 facilities when it can make various findings about feasibility, cost impacts and risk transfers. But that approach does not address our fundamental objection to the concept, which is that it would take IST decisions away from the process safety experts who know their own processes the best and would allow their judgments to be second-guessed by busy government officials sitting miles away reviewing documents. While these officials may be sincerely trying to do their best, we simply do not trust that their judgments will be better than ours. We also fear the prospect of liability if a "safer" process or chemical that one of our member companies is compelled to use ends up causing an accident or some other harm. Will the federal government indemnify facilities in the cases where it overrules their judgments regarding inherent safety? And even if a facility ultimately succeeds in persuading DHS to allow it to retain its proposed approach, that process will inevitably have costs in time and resources.

Preceding all these concerns, moreover, is an even more basic one: no one knows how to compare the "inherent safety" of two processes. Here is what the experts have told Congress:

> - I do not believe that the science currently exists to quantify inherent safety. . . . The first challenge is simply to measure the degree of inherent safety in a way that allows comparisons of alternative designs . . . .[8]
>
> - Inherently safer design is not a specific technology or set of tools and activities at this point in its development. . . . Current books and other literature on inherently safer design . . . describe a design philosophy and give examples of implementation, but do not describe a methodology.[9]
>
> - While scientists and engineers have made great strides in understanding the impacts of industrial processes and products over the past several decades, there is still no guaranteed formula for developing inherently safer production processes.[10]

The experts at the National Research Council concluded recently: "Inherently safer chemistry . . . offers the potential for improved safety at chemical facilities. While applications show promise and have found use within the chemical industry, these applications at present are still quite limited in scope."[11]

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[7] *See* H.R. 2868, § 202(a) (new 42 U.S.C. § 300i-2(g)(3)(B)), § 302(a) (new 33 U.S.C. § 1302(b)(3)(C)(ii)(I)).
[8] Testimony of Sam Mannan, *supra* note 5, at 6.
[9] Testimony of Dennis Hendershot, *supra* note 6, at 1-2.
[10] Testimony of Neal Langerman, *supra* note 4, at 6-7.

While it may be feasible to develop a technical consensus methodology for measuring and comparing inherent safety, none exists at present. Before Congress and the Administration could even consider mandating IST implementation, they would need to know that methodologies exist to compare various alternatives from the standpoint of inherent safety. As discussed above, DHS has launched a major effort to develop an IST database and to develop a consensus definition of IST. SOCMA members and staff have been participating in this effort and cautiously support it. It is too early to tell, however, how successful it will be. In fact, DHS just recently initiated a stakeholder process to achieve among experts a consensus on what IST is in a security regulatory context. However, at present, there appears to be little consensus. Congress might ask DHS also to study the over 1,000 facilities that have changed products or processes and thus reduced their risks sufficiently that they have been removed from the CFATS program. But Congress should otherwise avoid legislating in this area while that process is still ongoing.

IV. Conclusion

SOCMA supports permanent chemical site security standards that are risk-based and realistic, and we urge Congress to reauthorize the existing CFATS program. Mandating inherently safer technology as a security measure will inevitably create negative unintended consequences, and Congress should not require DHS to do so. SOCMA asks that you please support S. 2996 and maintain the same bipartisanship this committee demonstrated in 2005 when it initiated the process that led to CFATS.

On behalf of SOCMA, I appreciate this opportunity to present the association's views on these important issues. I look forward to your questions.

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[11] National Research Council, Board on Chemical Sciences & Technology, *Terrorism and the Chemical Infrastructure: Protecting People and Reducing Vulnerabilities* (2006), at 106.

Center for American Progress

New Survey Shows Improved Chemical Security Makes Millions Safer

March 2, 2010

March 2, 2010

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By Reece Rushing, Paul Orum

Interactive map: Protecting Americans from Toxic Terrorism

Chart: List of the 554 converted water utilities (pdf)

Fact sheet: Safer Chemicals Create a More Secure America

WASHINGTON—With the Senate Committee on Homeland Security and Government Affairs scheduled to hear testimony on Wednesday about proposed chemical security legislation, a new survey by the Center for American Progress identifies 554 drinking water and wastewater plants in 47 states that have replaced extremely hazardous substances with safer and more secure chemicals or processes.

More than 40 million Americans are no longer in danger of harm from a terrorist-released or accidental toxic gas plume because their water utility has converted to safer alternatives to chorine gas in water treatment.

"These facilities show what can be done with proven technologies to remove chemical hazards from communities," said Paul Orum, who conducted the survey as a consultant to the Center for American Progress. "Unfortunately, weak federal chemical security standards don't encourage more treatment plants to reduce their hazards."

The Department of Homeland Security and other agencies warn that terrorists could use industrial chemicals as pre-positioned weapons. Current temporary Chemical Facility Anti-Terrorism Standards, or CFATS, exempt water utilities and do not require any facilities to look for safer and more secure chemicals and processes.

At least 2,600 additional water and wastewater facilities still use large amounts of chlorine gas.

"Leading facilities have converted, but progress is slow," said Reece Rushing, Director of Government Reform at the Center for American Progress. "We know how to dramatically reduce the risk of toxic terrorism. But more than 2,500 water facilities still use large amounts of potentially deadly chlorine gas, threatening millions of Americans. We can do better."

The 554 converted water facilities are located in 47 states and the District of Columbia (all states except North Dakota, New Hampshire, and New Mexico). Of the 554 converted facilities, 235 treat drinking water, 315 treat wastewater, and four treat both. Of the 315 converted wastewater facilities, approximately 140 switched to ultraviolet light and 175 switched to liquid bleach.

About two-thirds of U.S. wastewater plants already use a disinfectant other than chlorine gas, according to the U.S. Government Accountability Office. Drinking water utilities in at least 160 large U.S. cities already use liquid bleach.

Water utilities use chlorine to disinfect drinking water or wastewater. Utilities may avoid chlorine gas by switching to liquid chlorine bleach (sodium hypochlorite), which they may buy in bulk or generate on site. Wastewater plants may also avoid chlorine gas by switching to ultraviolet light. Some wastewater plants also avoid sulfur dioxide gas, used to dechlorinate, by switching to sodium bisulfite.

In November 2009, the House passed the Chemical and Water Security Act (H.R. 2868), a comprehensive chemical security standard that would include water utilities and encourage hazardous chemical plants to develop safer and more secure technologies.

"Converted facilities are safer for employees and communities while reducing potential costs and liabilities for companies," Orum said. "Congress should ensure that high-hazard chemical facilities take reasonable steps to adopt proven alternatives."

The 554 converted facilities together removed their toxic gas dangers to 1 million or more people in 12 states: New York, New Jersey, California, Ohio, Maryland, Pennsylvania, Florida, Indiana, Georgia, Michigan, Louisiana, and Virginia. In an additional 22 states, the converted facilities removed their dangers to more than 100,000 people.

Interactive map: Protecting Americans from Toxic Terrorism

Chart: List of the 554 converted water utilities (pdf)

Fact sheet: Safer Chemicals Create a More Secure America

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Center for American Progress

Safer Chemicals Create a More Secure America

We Can Diminish the Security Threat from Chemical Plants

March 2, 2010

The Department of Homeland Security and numerous security experts warn that terrorists could use industrial chemicals as improvised weapons of mass destruction. But chemical facilities can often remove the danger of a catastrophic chemical release and make themselves less attractive targets for terrorists by using safer and more secure chemicals or processes. Such alternatives invest in American workplaces and communities—and are already used in many industries.

Research shows that hundreds of chemical facilities are switching to safer, more secure chemical processes, while eliminating dangers to millions of people. Cost-effective alternatives are already in use at bleach producers, water utilities, power plants, oil refineries, aluminum smelters, and many manufacturers, among other industries. But many other facilities have not yet adopted available alternatives.

Yet the Interim Chemical Facility Anti-Terrorism Standards, which expire October 4, 2010, address site security without developing ways to remove unnecessary terror targets. Physical site security, however worthy, cannot assure protection, address supply chain risk, or modernize facilities. The temporary standards exempt thousands of water utilities and ports from security requirements, exclude knowledgeable employees from security planning, lack basic accountability for government enforcement, and even bar DHS from requiring any specific security measure.

The Chemical and Water Security Act, H.R. 2868, now under consideration in the Senate Homeland Security and Governmental Affairs Committee, as well as the Senate Environment and Public Works Committee, establishes a permanent comprehensive program that would require high-hazard chemical plants to review methods to reduce the consequences of a terrorist attack. It would require the very highest hazard facilities to implement such techniques where cost effective, technically feasible, and risk reducing. And also it would provide limited funding for facilities that upgrade to safer, more secure technologies.

These measures would help secure our nation's chemical facilities and keep Americans safer. And in fact, reports from the Center for American Progress show that many companies already use intrinsically more secure technologies that remove the danger of a major toxic gas release.

The following options remove catastrophic toxic gas release dangers to employees and communities and are *already in use* in the United States.

Companies typically adopt an alternate chemical or process, use a chemical in a less dangerous or less concentrated form, or generate a chemical only as needed without storage. Other options include colocating chemical suppliers with users, improving inventory control, or minimizing bulk storage. These changes remove unnecessary dangers and avoid certain costs related to regulatory compliance, liability insurance, personal protective equipment, community notification, site security, and emergency planning.

- Bleach manufacturers eliminate bulk chlorine gas by generating chlorine on-site as needed without storage.
- Petroleum refineries eliminate hydrofluoric acid alkylation by using less hazardous sulfuric acid or by developing solid acid catalysts.
- Water utilities eliminate bulk chlorine gas by using liquid bleach, ozone without storage, and ultraviolet light as appropriate.
- Paper mills eliminate bulk chlorine gas by using hydrogen peroxide, ozone, or chlorine dioxide without bulk storage.
- Pool service companies eliminate chlorine gas by using chlorine tabs or liquid bleach.
- Manufacturers of polyurethane foams eliminate bulk ethylene oxide by substituting vegetable-based polyols.
- Soap and detergent manufacturers eliminate bulk oleum and sulfur trioxide by using sulfur burning equipment on site.
- Manufacturers of ferric chloride eliminate bulk chlorine gas by processing scrap steel with less concentrated liquid hydrochloric acid (less than 37 percent) and oxygen.
- Titanium dioxide producers eliminate bulk chlorine gas by generating chlorine onsite or using the sulfate process.
- Secondary aluminum smelters eliminate bulk chlorine gas by removing impurities with nitrogen gas injected with magnesium salts.

- Manufacturers of semiconductors, silicon wafers, and metal products eliminate concentrated hydrofluoric acid by using less concentrated forms (less than 50 percent).

- Power plants eliminate bulk anhydrous ammonia gas by using cleaner combustion or by using aqueous ammonia or urea in pollution control equipment; they also remove chlorine gas by using liquid bleach to treat cooling water.

- Wholesale chemical distributors eliminate most bulk chlorine gas and sulfur dioxide gas by distributing alternatives such as liquid bleach and sodium bisulfite.

- Pulp mills, food processors, wastewater plants, and hazardous waste recovery operations eliminate bulk sulfur dioxide gas by, as appropriate, generating sulfur compounds on site or purchasing sodium bisulfite, metabisulfite, hydrosulfite, or other alternatives.

- Diverse manufacturers eliminate bulk chlorine gas by generating chlorine on site as needed, such as for fuel additives, water treatment chemicals, and aramid polymers used to make bulletproof vests.

These existing practices show what is possible for companies and the federal government as they work to eliminate the homeland security risks of using, manufacturing, and transporting dangerous chemicals.

Center for American Progress

Water utilities that have converted from extremely hazardous substances

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
1	Ketchikan Chlorination Plant	Ketchikan	AK	Drinking water	Chlorine gas	1.90	5,510	Liquid bleach
3	Choccolocco Creek Wastewater Treatment Plant	Oxford	AL	Wastewater	Chlorine gas	1.30	3,200	Ultraviolet light
4	John B. Rains Filter Plant	Fort Payne	AL	Drinking water	Chlorine gas	2.63	4,763	Liquid bleach
7	Valley Creek Wastewater Treatment Plant	Bessemer	AL	Wastewater	Sulfur dioxide gas	1.68	7,800	Ultraviolet light
6	Cahaba River Wastewater Treatment Plant	Birmingham	AL	Wastewater	Chlorine gas	0.90	5,176	Ultraviolet light
6	Shades Mountain Filter Plant	Birmingham	AL	Drinking water	Chlorine gas	3.04	53,000	Liquid bleach
7	Five Mile Creek Wastewater Treatment Plant	Fultondale	AL	Wastewater	Chlorine gas	2.06	13,200	Ultraviolet light
1	Carlos A Morris WWTP	Prichard	AL	Wastewater	Chlorine gas	1.30	31,500	Liquid bleach
1	Stanley Brooks WWTP	Prichard	AL	Wastewater	Sulfur dioxide gas	1.30	6,000	Sodium bisulfite/bleach
3	Sugar Creek Wastewater Treatment Plant	Alexander City	AL	Wastewater	Chlorine gas	1.30	660	Liquid bleach
3	Harrison Waste Water Treatment Plant	Harrison	AR	Wastewater	Chlorine gas	0.60	108	Ultraviolet light
3	Berryville, City of-WWTP	Berryville	AR	Wastewater	Chlorine gas	2.20	4,000	Ultraviolet light
3	City of Van Buren Main Plant	Van Buren	AR	Wastewater	Chlorine gas	3.00	22,000	Ultraviolet light
1	Wynne Water Utilities	Wynne	AR	Wastewater	Chlorine gas	2.20	881	Ultraviolet light
3	Russellville Water Treatment Plant	Russellville	AR	Drinking water	Chlorine gas	3.00	5,380	Liquid bleach
2	Adams Field Wastewater Treatment Plant	Little Rock	AR	Wastewater	Chlorine gas	2.53	12,600	Ultraviolet light
2	Jack H. Wilson Water Treatment Plant	Little Rock	AR	Drinking water	Chlorine gas	3.00	54,000	Liquid bleach (converting)
2	Ozark Water Treatment Plant	Little Rock	AR	Drinking water	Chlorine gas	3.00	74,000	Liquid bleach (converting)
2	Hazel Street Wastewater Treatment Plant	Benton	AR	Wastewater	Chlorine gas	1.30	7,690	Ultraviolet light
3	Massard Wastewater Treatment Facility	Barling	AR	Wastewater	Chlorine gas	2.60	2,701	Ultraviolet light
3	Benton/Washington Regional Public Water Authority	Lincoln	AR	Drinking water	Chlorine gas	1.10	75	Liquid bleach
6	Chandler Water Treatment Plant	Chandler	AZ	Drinking water	Chlorine gas	1.30	13,000	Liquid bleach
2	City of El Mirage Wastewater Treatment Plant	El Mirage	AZ	Wastewater	Chlorine gas	1.30	0	Liquid bleach/UV
2	Goodyear 157th Ave. Wastewater Treatment Plant	Goodyear	AZ	Wastewater	Chlorine gas	3.70	200	Liquid bleach
5	Northwest Water Reclamation Plant	Mesa	AZ	Wastewater	Chlorine gas	1.30	13,000	Ultraviolet light
6	Southeast Water Reclamation Plant	Mesa	AZ	Wastewater	Chlorine gas	1.30	2,400	Ultraviolet light
5	Johnny G. Martinez Water Treatment Plant	Tempe	AZ	Drinking water	Chlorine gas	0.90	7,070	Liquid bleach
5	South Tempe Water Treatment Plant	Tempe	AZ	Drinking water	Chlorine gas	0.90	11,293	Liquid bleach
7	Water Pollution Control Facility - Figueroa	Yuma	AZ	Wastewater	Chlorine gas	1.30	1,000	Liquid bleach
3	Ione Water Treatment Plant	Ione	CA	Drinking water	Chlorine gas	1.30	8,000	Liquid bleach
3	Tanner Water Treatment Plant	Sutter Creek	CA	Drinking water	Chlorine gas	3.00	1,800	Liquid bleach
3	City of Angels Water Treatment Facility	Angels Camp	CA	Drinking water	Chlorine gas	1.30	2,028	Liquid bleach
3	Ebbetts Pass (Hunters) Water Treatment Plant	Hathaway Pines	CA	Drinking water	Chlorine gas	1.30	1,515	Liquid bleach
3	Jenny Lind Water Treatment Plant	Valley Springs	CA	Drinking water	Chlorine gas	1.30	196	Liquid bleach
3	La Contenta Wastewater Treatment Plant	Valley Springs	CA	Wastewater	Chlorine gas	1.30	215	Ultraviolet light
4	South Tahoe Public Utility District	South Lake Tahoe	CA	Wastewater	Chlorine gas	7.20	27,000	Liquid bleach
22	KCWA ID4 Water Purification Plant	Bakersfield	CA	Drinking water	Chlorine gas	1.30	16,663	Liquid bleach
32	Canyon Chlorination Facility	Azusa	CA	Drinking water	Chlorine gas	5.00	5,085	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
32	Canyon Filtration Plant	Azusa	CA	Drinking water	Chlorine gas	5.00	5,086	Liquid bleach
29	Burbank Water Reclamation Plant Chlorination Stn.	Burbank	CA	Wastewater	Chlorine gas	1.00	32,000	Liquid bleach
30	Tapia Water Reclamation Facility	Calabasas	CA	Wastewater	Chlorine gas	4.40	23,000	Liquid bleach
37	Joint Water Pollution Control Plant	Carson	CA	Wastewater	Chlorine gas	3.80	210,000	Liquid bleach
46	Long Beach Water Reclamation Plant	Long Beach	CA	Wastewater	Sulfur dioxide gas	3.90	250,000	Sodium bisulfite/bleach
38	Pomona Water Reclamation Plant	Pomona	CA	Wastewater	Sulfur dioxide gas	2.44	57,000	Sodium bisulfite/bleach
32	Whittier Narrows Water Reclamation Plant	South El Monte	CA	Wastewater	Sulfur dioxide gas	2.50	98,000	Sodium bisulfite/bleach
27	D.C. Tillman Water Reclamation Plant	Van Nuys	CA	Wastewater	Chlorine gas	2.50	112,000	Liquid bleach
30	Westlake Water Filtration Plant	Westlake Village	CA	Drinking water	Chlorine gas	0.94	4,474	Liquid bleach
18	City of Merced Wastewater Treatment Facility	Merced	CA	Wastewater	Sulfur dioxide gas	7.00	68,270	Sodium bisulfite/bleach
48	Big Canyon Reservoir	Corona Del Mar	CA	Drinking water	Chlorine gas	1.30	18,000	Liquid bleach
48	J.B. Latham Regional Plant	Dana Point	CA	Wastewater	Chlorine gas	1.30	20,000	Liquid bleach
46	Orange County Water District	Fountain Valley	CA	Drinking water	Chlorine gas	4.00	406,000	Liquid bleach
42	3A Treatment Plant	Laguna Niguel	CA	Wastewater	Chlorine gas	2.70	42,000	Liquid bleach
42	Yorba Linda Water District	Placentia	CA	Drinking water	Chlorine gas	1.30	27,000	Liquid bleach
4	Dry Creek Regional Wastewater Treatment Plant	Roseville	CA	Wastewater	Chlorine gas	9.90	626,000	Ultraviolet light
49	Water Treatment Plant	Canyon Lake	CA	Drinking water	Chlorine gas	2.25	6,540	Liquid bleach
45	Valley Sanitary District Water Reclamation Plant	Indio	CA	Wastewater	Chlorine gas	4.50	76,500	Liquid bleach
49	Horsethief Canyon Water Reclamation Facility	Lake Elsinore	CA	Wastewater	Chlorine gas	2.25	5,430	Liquid bleach
49	Railroad Canyon Water Reclamation Facility	Lake Elsinore	CA	Wastewater	Chlorine gas	2.25	14,182	Liquid bleach
49	Regional Wastewater Facility	Lake Elsinore	CA	Wastewater	Chlorine gas	1.00	1,070	Ultraviolet light
45	CalOaks Pumping Station	Murietta	CA	Drinking water	Chlorine gas	1.40	4,200	Liquid bleach
44	Lake Mathews Reservoir	Riverside	CA	Drinking water	Chlorine gas	6.20	94,000	Liquid bleach
44	March Wastewater Reclamation Facility	Riverside	CA	Wastewater	Chlorine gas	2.20	7,959	Liquid bleach
44	Riverside Regional Water Quality Control Plant	Riverside	CA	Wastewater	Chlorine gas	3.20	129,000	Liquid bleach
3	WF1 Calvine Meadows WTP	Elk Grove	CA	Drinking water	Chlorine gas	3.00	4,500	Liquid bleach
3	WT2 Waterman Road WTP	Elk Grove	CA	Drinking water	Chlorine gas	0.90	8,310	Liquid bleach
43	Rialto Wastewater Treatment Plant	Bloomington	CA	Wastewater	Chlorine gas	2.70	52,523	Ultraviolet light
26	Royer Nesbit Treatment Plant	Etiwanda	CA	Drinking water	Chlorine gas	3.00	25,000	Liquid bleach
43	Grand Terrace Chlorination Station	Grand Terrace	CA	Drinking water	Chlorine gas	1.30	12,926	Liquid bleach
43	Regional Plant #1	Ontario	CA	Wastewater	Chlorine gas	7.00	350,000	Liquid bleach
49	Rainbow Municipal Water District	Fallbrook	CA	Drinking water	Chlorine gas	3.00	8,000	Liquid bleach
49	Red Mountain Station	Fallbrook	CA	Drinking water	Chlorine gas	3.00	4,260	Liquid bleach
49	Betsworth Facility	Valley Center	CA	Drinking water	Chlorine gas	5.60	24,000	Calcium hypochlorite
49	Cool Valley Facility	Valley Center	CA	Drinking water	Chlorine gas	3.40	3,400	Calcium hypochlorite
11	White Slough Water Pollution Control Facility	Lodi	CA	Wastewater	Chlorine gas	25.00	606,505	Ultraviolet light
11	Wastewater Quality Control Facility	Manteca	CA	Wastewater	Sulfur dioxide gas	5.40	71,540	Ultraviolet light
14	Palo Alto Regional Water Quality Control Plant	Palo Alto	CA	Wastewater	Sulfur dioxide gas	4.80	191,998	Sodium bisulfite/bleach
7	Easterly Wastewater Treatment Plant	Elmira	CA	Wastewater	Chlorine gas	3.00	4,100	Liquid bleach
10	North Bay Regional Water Treatment Plant	Fairfield	CA	Drinking water	Chlorine gas	3.00	16,500	Liquid bleach
10	Waterman Water Treatment Plant	Fairfield	CA	Drinking water	Chlorine gas	1.30	18,000	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
23	City of Oxnard Wastewater Treatment Plant	Oxnard	CA	Wastewater	Chlorine gas	0.90	4,750	Liquid bleach
2	Olivehurst PUD Wastewater Treatment Plant	Olivehurst	CA	Wastewater	Chlorine gas	3.00	12,140	Ultraviolet light
2	Wes Brown Treatment Plant	Thornton	CO	Drinking water	Chlorine gas	1.30	11,667	Liquid bleach/UV
2	Big Dry Creek Water Reclamation Facility	Westminster	CO	Wastewater	Chlorine gas	3.00	26,000	Ultraviolet light
2	63rd Street Water Treatment Plant	Boulder	CO	Drinking water	Chlorine gas	4.80	960	Liquid bleach
2	Betasso Water Treatment Plant	Boulder	CO	Drinking water	Chlorine gas	3.07	9,200	Liquid bleach
4	City of Longmont Wastewater Treatment Plant	Longmont	CO	Wastewater	Chlorine gas	3.00	41,000	Ultraviolet light
2	Upper Eagle Regional Water Authority Plant	Avon	CO	Drinking water	Chlorine gas	1.30	3,000	Liquid bleach
2	Arvada Water Treatment Plant	Arvada	CO	Drinking water	Chlorine gas	3.00	23,878	Liquid bleach
2	Ralston Water Treatment Plant	Arvada	CO	Drinking water	Chlorine gas	4.20	23,878	Liquid bleach
7	City of Golden Water Treatment Plant	Golden	CO	Drinking water	Chlorine gas	0.90	5,900	Liquid bleach
7	Maple Grove Water Treatment Plant	Lakewood	CO	Drinking water	Chlorine gas	0.90	4,000	Liquid bleach
4	City of Loveland Wastewater Treatment Plant	Loveland	CO	Wastewater	Chlorine gas	1.30	4,952	Ultraviolet light
3	Fish Creek Filtration Plant	Steamboat Springs	CO	Drinking water	Chlorine gas	2.40	5,000	Liquid bleach
4	23rd Ave Treated Water Storage Facility	Greeley	CO	Drinking water	Chlorine gas	0.90	5,122	Liquid bleach
4	Water Pollution Control Facility	Greeley	CO	Wastewater	Chlorine gas	0.90	1,500	Ultraviolet light
4	Mianus Water Treatment Plant-Aquarion Water Co.	Cos Cob	CT	Drinking water	Chlorine gas	1.30	9,700	Liquid bleach
5	City of Danbury - West Lake Water Treatment Plant	Danbury	CT	Drinking water	Chlorine gas	1.30	9,474	Liquid bleach
4	BHC Easton LakeTreatment Plant	Easton	CT	Drinking water	Chlorine gas	3.00	26,000	Liquid bleach
4	Fairfield Water Pollution Control Facility	Fairfield	CT	Wastewater	Chlorine gas	1.30	6,500	Ultraviolet light
4	BHC Stamford Water Treatment Plant	Stamford	CT	Drinking water	Chlorine gas	3.00	30,000	Liquid bleach
4	Stamford WPCF	Stamford	CT	Wastewater	Chlorine gas	2.20	70,000	Ultraviolet light
1	Hockanum River Water Pollution Control Facility	Manchester	CT	Wastewater	Chlorine gas	1.30	5,000	Ultraviolet light
5	New Britain Water Department	New Britain	CT	Drinking water	Chlorine gas	2.00	10,000	Liquid bleach
1	Reservoir 6 Water Treatment Facility	West Hartford	CT	Drinking water	Chlorine gas	0.90	844	Liquid bleach
1	West Hartford Water Treatment Facility	West Hartford	CT	Drinking water	Chlorine gas	1.30	5,017	Liquid bleach
3	Lake Saltonstall Water Treatment Plant	East Haven	CT	Drinking water	Chlorine gas	3.00	63,000	Liquid bleach
5	City of Meriden Water Pollution Control Facility	Meriden	CT	Wastewater	Chlorine gas	3.00	56,400	Liquid bleach
3	Lake Gaillard Water Treatment Plant	North Branford	CT	Drinking water	Chlorine gas	3.00	24,000	Liquid bleach
3	City of West Haven Water Pollution Control Fac.	West Haven	CT	Wastewater	Chlorine gas	3.00	113,192	Liquid bleach
3	West River Water Treatment Plant	Woodbridge	CT	Drinking water	Chlorine gas	3.00	29,000	Liquid bleach
2	Norwich Wastewater Treatment Plant	Norwich	CT	Wastewater	Chlorine gas	1.30	13,238	Liquid bleach
1	Blue Plains Wastewater Treatment Plant	Washington	DC	Wastewater	Sulfur dioxide gas	15.00	1,700,000	Sodium bisulfite/bleach
1	Delaware City Wastewater Treatment Plant	Delaware City	DE	Wastewater	Chlorine gas	0.90	78	Liquid bleach
1	MOT Water Farm No. 1	Odessa	DE	Wastewater	Chlorine gas	1.30	1,500	Ultraviolet light
1	City of Wilmington Water Pollution Control Fac.	Wilmington	DE	Wastewater	Chlorine gas	13.00	560,000	Liquid bleach
1	Board of Public Works	Lewes	DE	Wastewater	Chlorine gas	1.60	2,800	Ultraviolet light
15	D. B. Lee Wastewater Treatment Facility	Melbourne	FL	Wastewater	Chlorine gas	1.30	10,596	Liquid bleach
15	City of Palm Bay	Palm Bay	FL	Drinking water	Chlorine gas	0.30	500	Liquid bleach
23	Peele-Dixie Water Treatment Plant	Fort Lauderdale	FL	Drinking water	Ammonia gas	2.00	50,300	Aqueous ammonia/bleach
19	East & West Site Water & Wastewater Facilities	Margate	FL	Drinking/Wastewater	Chlorine gas	2.60	98,000	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
17	The City of Miramar East Water Treatment Plant	Miramar	FL	Drinking water	Chlorine gas	1.30	35,000	Liquid bleach
3	Arlington Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	45,000	Liquid bleach
3	Buckman Water Reclamation Facility	Jacksonville	FL	Wastewater	Chlorine gas	7.90	360,000	Ultraviolet light
4	Community Hall Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	17,000	Liquid bleach
4	Deerwood 3 Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	14,000	Liquid bleach
4	District II Water Reclamation Facility	Jacksonville	FL	Wastewater	Chlorine gas	2.10	3,000	Ultraviolet light
3	Fairfax Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	57,000	Liquid bleach
4	Hendricks Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	1.70	17,000	Liquid bleach
3	Highlands Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	18,000	Liquid bleach
4	Lakeshore Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	1.70	29,000	Liquid bleach
3	Lovegrove Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	1.70	30,000	Liquid bleach
3	Main Street Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	1.60	29,000	Liquid bleach
6	Marietta Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	12,000	Liquid bleach
4	McDuff Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	44,000	Liquid bleach
3	Norwood Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	50,000	Liquid bleach
4	Oakridge Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	15,000	Liquid bleach
4	Ridenour Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	15,000	Liquid bleach
3	River Oaks Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	28,000	Liquid bleach
4	Southeast Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	4,400	Liquid bleach
6	Southwest Water Treatment Plant	Jacksonville	FL	Drinking water	Chlorine gas	2.10	28,000	Liquid bleach
9	Lake Bridge Water Treatment Plant	Lutz	FL	Drinking water	Chlorine gas	3.60	5,606	Liquid bleach
12	Falkenburg Advanced Wastewater Treatment Plant	Tampa	FL	Wastewater	Chlorine gas	4.80	12,000	Ultraviolet light
9	Northwest Regional Water Reclamation Facility	Tampa	FL	Wastewater	Chlorine gas	4.80	13,000	Ultraviolet light
11	River Oaks Advanced Wastewater Tratment Plant	Tampa	FL	Wastewater	Chlorine gas	4.80	38,000	Liquid bleach
6	Leesburg Wastewater Treatment Plant	Leesburg	FL	Wastewater	Chlorine gas	1.30	6,000	Liquid bleach
14	BSU Water Treatment Plant	Bonita Springs	FL	Drinking water	Chlorine gas	1.02	300	Liquid bleach
14	Central Advanced Wastewater Treatment Facility	Fort Myers	FL	Wastewater	Chlorine gas	2.93	53,885	Liquid bleach
14	Green Meadows Water Treatment Plant	Fort Myers	FL	Drinking water	Chlorine gas	3.00	200	Liquid bleach
14	South Advanced Wastewater Treatment Facility	Fort Myers	FL	Wastewater	Chlorine gas	2.93	41,919	Liquid bleach
14	Greater Pine Island Reverse Osmosis WTP	St. James City	FL	Drinking water	Chlorine gas	0.90	290	Liquid bleach
6	Water Reclamation Facility #1	Ocala	FL	Wastewater	Chlorine gas	0.90	71	Liquid bleach
6	Water Reclamation Facility #2	Ocala	FL	Wastewater	Chlorine gas	0.90	71	Liquid bleach
21	Hialeah Water Treatment Plant	Hialeah	FL	Drinking water	Ammonia gas	3.10	110,000	Aqueous ammonia
17	Oeffler-Norwood Water Treatment Plant	Miami	FL	Drinking water	Chlorine gas	1.90	10,000	Liquid bleach
8	Eastern Regional Water Production Facility	Orlando	FL	Drinking water	Chlorine gas	0.90	5,631	Liquid bleach
24	Eastern Regional Water Reclamation Facility	Orlando	FL	Wastewater	Chlorine gas	1.30	576	Liquid bleach
16	Acme Improvement District Water Treatment Plant	Wellington	FL	Drinking water	Chlorine gas	3.50	44,343	Liquid bleach
9	Hudson Wastewater Treatment Plant	Hudson	FL	Wastewater	Chlorine gas	1.30	6,200	Liquid bleach
5	Cypress Creek Pumping Station	Land O'Lakes	FL	Drinking water	Chlorine gas	3.60	4,386	Liquid bleach
9	Deer Park Wastewater Treatment Plant	New Port Richey	FL	Wastewater	Chlorine gas	1.30	22,600	Liquid bleach
5	Little Road Water Treatment Plant	New Port Richey	FL	Drinking water	Chlorine gas	1.30	8,400	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
9	Embassy Hills Wastewater Treatment Plant	Newport Richey	FL	Wastewater	Chlorine gas	1.30	7,900	Liquid bleach
5	Shady Hills Wastewater Treatment Plant	Spring Hill	FL	Wastewater	Chlorine gas	3.00	2,900	Liquid bleach
5	Wesley Center Wastewater Treatment Plant	Wesley Chapel	FL	Wastewater	Chlorine gas	1.30	2,500	Liquid bleach
5	Southeast Wastewater Treatment Plant	Zephyrhills	FL	Wastewater	Chlorine gas	1.30	970	Liquid bleach
9	East Advanced Pollution Control Facility	Clearwater	FL	Wastewater	Chlorine gas	0.90	5,007	Liquid bleach
9	Marshall St. Advanced Pollution Control Facility	Clearwater	FL	Wastewater	Chlorine gas	0.90	10,160	Liquid bleach
9	Northeast Advanced Pollution Control Facility	Clearwater	FL	Wastewater	Chlorine gas	2.20	38,000	Liquid bleach
9	Reservoir 1	Clearwater	FL	Drinking water	Chlorine gas	2.00	54,000	Liquid bleach
9	Reservoir 2	Clearwater	FL	Drinking water	Chlorine gas	2.00	37,000	Liquid bleach
9	Reservoir 3	Clearwater	FL	Drinking water	Chlorine gas	2.00	39,000	Liquid bleach
10	Albert Whittted Water Reclamation Facility	St. Petersburg	FL	Wastewater	Chlorine gas	1.62	32,000	Liquid bleach
12	Polk County South County Jail WTF	Frostproof	FL	Drinking water	Chlorine gas	3.10	5,257	Liquid bleach
12	Polk County Turner Road WPF	Mulberry	FL	Drinking water	Chlorine gas	3.10	23,000	Liquid bleach
12	Polk County Central Regional WWTF	Winter Haven	FL	Wastewater	Chlorine gas	3.10	14,316	Liquid bleach
12	Polk County Gordonville WPF	Winter Haven	FL	Drinking water	Chlorine gas	3.10	1,900	Liquid bleach
13	Eastside W.R.F.	Nokomis	FL	Wastewater	Chlorine gas	1.30	2,493	Liquid bleach
13	City of North Port Wastewater Treatment Plant	North Port	FL	Wastewater	Chlorine gas	1.30	1,197	Liquid bleach
13	City of North Port Water Treatment Plant	North Port	FL	Drinking water	Chlorine gas	1.30	3,312	Liquid bleach
13	City of Venice R. O. Water Treatment Plant	Venice	FL	Drinking water	Chlorine gas	1.30	5,993	Liquid bleach
13	T. Mabry Carlton Water Treatment Facility	Venice	FL	Drinking water	Chlorine gas	3.17	2,200	Liquid bleach
24	City of Altamonte Springs Water Treatment Plant #2	Altamonte Springs	FL	Drinking water	Chlorine gas	1.30	20,428	Liquid bleach
24	City of Altamonte Springs Water Treatment Plant #5	Altamonte Springs	FL	Drinking water	Chlorine gas	1.30	17,242	Liquid bleach
7	Greenwood Lakes WWTP	Lake Mary	FL	Wastewater	Chlorine gas	1.30	25,440	Liquid bleach
7	Des Pinar WTP/WWTF Site	Longwood	FL	Drinking/Wastewater	Chlorine gas	1.30	6,300	Liquid bleach
7	Wekiva Hunt Club WWTF/WTP	Longwood	FL	Drinking/Wastewater	Chlorine gas	1.30	11,600	Liquid bleach
7	Northwest Regional WWTP	Sanford	FL	Wastewater	Chlorine gas	0.40	4	Liquid bleach
24	Winter Springs East Wastewater Plant	Winter Springs	FL	Wastewater	Chlorine gas	1.30	5,124	Liquid bleach
7	Bethune Point Wastewater Treatment Plant	Daytona Beach	FL	Wastewater	Chlorine gas	1.30	22,147	Ultraviolet light
24	Brennan Water Treatment Plant	Daytona Beach	FL	Drinking water	Chlorine gas	1.30	75	Liquid bleach
24	Westside Regional Wastewater Treatment Plant	Daytona Beach	FL	Wastewater	Chlorine gas	1.30	148	Ultraviolet light
7	Ormond Beach Wastewater Treatment Plant	Ormond Beach	FL	Wastewater	Sulfur dioxide gas	1.33	9,600	Sodium bisulfite/bleach
7	Ormond Beach Water Treatment Plant	Ormond Beach	FL	Drinking water	Chlorine gas	1.33	11,000	Liquid bleach
24	R. Dwayne Huffman Reclaimed Water Plant	Port Orange	FL	Wastewater	Chlorine gas	0.90	18,000	Liquid bleach
11	Cartersville Waste Water Pollution Control Plant	Cartersville	GA	Wastewater	Chlorine gas	2.20	7,074	Liquid bleach
1	Naval Submarine Base (NSB) Kings Bay	Kings Bay	GA	Drinking/Wastewater	Chlorine gas	1.30	652	Liquid bleach
1	Mission Trace Water Plant	St. Marys	GA	Drinking water	Chlorine gas	1.30	12,000	Liquid bleach
1	Water Plant #3 (Old Jefferson Road)	St. Marys	GA	Drinking water	Chlorine gas	1.30	10,000	Liquid bleach
1	Weed Street Wastewater Treatment Plant	St. Marys	GA	Wastewater	Chlorine gas	0.40	1,000	Liquid bleach
1	Tybee Island Wastewater Treatment Plant	Tybee Island	GA	Wastewater	Chlorine gas	1.30	2,000	Ultraviolet light
6	Rose Creek Water Pollution Control Plant	Woodstock	GA	Wastewater	Chlorine gas	1.30	10,160	Calcium hypochlorite
10	J. G. Beacham Water Treatment Plant	Athens	GA	Drinking water	Chlorine gas	0.90	12,185	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
6	South Cobb WRF	Austell	GA	Wastewater	Chlorine gas	3.01	40,656	Liquid bleach
11	Noonday Creek WRF	Kennesaw	GA	Wastewater	Chlorine gas	2.62	47,200	Ultraviolet light
6	Quarles Water Treatment Plant	Marietta	GA	Drinking water	Chlorine gas	0.90	4,390	Liquid bleach
10	Clark Hill Water Treatment Plant	Appling	GA	Drinking water	Chlorine gas	1.30	150	Liquid bleach
10	Little River WPCP	Evans	GA	Wastewater	Chlorine gas	1.30	1,400	Ultraviolet light
10	Jim Blanchard Water Treatment Plant	Martinez	GA	Drinking water	Chlorine gas	1.30	3,530	Liquid bleach
10	Reed Creek WPCP	Martinez	GA	Wastewater	Chlorine gas	1.30	3,530	Ultraviolet light
5	R. M. Clayton WRC	Atlanta	GA	Wastewater	Chlorine gas	14.00	1,151,993	Ultraviolet light
10	Augusta Water Treatment FilterPlant	Augusta	GA	Drinking water	Chlorine gas	0.90	6,017	Liquid bleach
12	J. B. Messerly Wastewater Treatment Plant	Augusta	GA	Wastewater	Chlorine gas	1.30	3,300	Liquid bleach
12	Spirit Creek Wastewater Treatment Plant	Augusta	GA	Wastewater	Chlorine gas	0.90	1,000	Liquid bleach
2	Waikoloa Beach Resort Water Reclamation Plant	Waikoloa	HI	Wastewater	Chlorine gas	3.00	3,000	Liquid bleach
2	Kaunakakai WWRF	Kaunakakai	HI	Wastewater	Chlorine gas	0.80	1,000	Liquid bleach
4	Mason City Water Department	Mason City	IA	Drinking water	Chlorine gas	0.90	1,700	Liquid bleach
1	Eagle Point Water Plant	Dubuque	IA	Drinking water	Chlorine gas	5.40	59,459	Liquid bleach
3	West Des Moines Water Works	West Des Moines	IA	Drinking water	Chlorine gas	4.30	87,874	Liquid bleach
5	Sioux City WWTP	Sioux City	IA	Wastewater	Chlorine gas	3.00	10,635	Liquid bleach
1	City of Boise-West Boise WWTP	Boise	ID	Wastewater	Chlorine gas	1.30	6,000	Ultraviolet light
10	Wilmette Water Plant	Wilmette	IL	Drinking water	Chlorine gas	2.60	50,000	Liquid bleach
13	Downers Grove Sanitary District	Downers Grove	IL	Wastewater	Chlorine gas	0.90	6,880	Liquid bleach
6	City of Elmhurst Wastewater Treatment Plant	Elmhurst	IL	Wastewater	Chlorine gas	3.00	100,000	Liquid bleach
19	Mt.Vernon Wastewater Treatment Facility	Mt. Vernon	IL	Wastewater	Chlorine gas	1.30	2,250	Liquid bleach
14	Aurora Water Treatment Plant	Aurora	IL	Drinking water	Chlorine gas	1.30	17,000	Liquid bleach
10	Village of Mundelein-Waste Water Treatment Plant	Libertyville	IL	Wastewater	Chlorine gas	0.90	1,734	Liquid bleach
17	Sanitary District of Decatur	Decatur	IL	Wastewater	Chlorine gas	3.80	59,000	Liquid bleach/UV
12	Granite City Regional Waste Water Treatment Plant	Granite City	IL	Wastewater	Chlorine gas	2.30	7,000	Liquid bleach
8	Woodstock Northside Wastewater Treatment Plant	Woodstock	IL	Wastewater	Chlorine gas	6.00	25,000	Liquid bleach
17	Moline Water Treatment Plant	Moline	IL	Drinking water	Chlorine gas	5.40	198,871	Liquid bleach
13	Springbrook Water Reclamation Center	Naperville	IL	Wastewater	Sulfur dioxide gas	1.91	4,830	Sodium bisulfite/bleach
3	Water Pollution Control Plant	Fort Wayne	IN	Wastewater	Chlorine gas	14.00	330,000	Liquid bleach
9	Jeffersonville Wastewater Treatment Plant	Jeffersonville	IN	Wastewater	Chlorine gas	1.00	8,000	Ultraviolet light
9	Jasper Wastewater Treatment Plant	Jasper	IN	Wastewater	Chlorine gas	1.30	7,000	Ultraviolet light
9	Seymour Wastewater Treatment Facility	Seymour	IN	Wastewater	Chlorine gas	1.30	1,500	Ultraviolet light
8	Vincennes Wastewater Treatment Facility	Vincennes	IN	Wastewater	Chlorine gas	1.60	8,455	Ultraviolet light
7	Fall Creek Water Treatment Plant	Indianapolis	IN	Drinking water	Chlorine gas	11.00	771,633	Liquid bleach
7	White River Water Treatment Plant	Indianapolis	IN	Drinking water	Chlorine gas	15.00	968,579	Liquid bleach
1	Flint Lake Treatment Plant 2	Valparaiso	IN	Drinking water	Chlorine gas	0.90	1,523	Liquid bleach
2	Mishawaka Wastewater Treatment Plant	Mishawaka	IN	Wastewater	Chlorine gas	1.30	24,500	Liquid bleach
2	Edison Filtration Plant and Well Field	South Bend	IN	Drinking water	Chlorine gas	1.30	18,815	Liquid bleach
2	Olive St. Well Field	South Bend	IN	Drinking water	Chlorine gas	1.30	14,158	Liquid bleach
4	Canal Road Pumping Station	Lafayette	IN	Drinking water	Chlorine gas	1.30	27,000	Liquid bleach
4	Glick Pumping Station	Lafayette	IN	Drinking water	Chlorine gas	1.30	18,000	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
2	Clinton Reservoir Water Treatment Plant	Lawrence	KS	Drinking water	Chlorine gas	1.30	7,654	Liquid bleach
3	Kaw River Water Treatment Plant	Lawrence	KS	Drinking water	Chlorine gas	1.30	3,400	Liquid bleach
3	Johnson County Wastewater-Tomahawk	Leawood	KS	Wastewater	Chlorine gas	0.90	2,806	Ultraviolet light
3	Johnson County Wastewater-Martway Pump Station	Mission	KS	Wastewater	Chlorine gas	0.90	9,815	Ultraviolet light
3	Johnson County Wastewater-Nelson Complex	Mission	KS	Wastewater	Chlorine gas	0.90	10,201	Ultraviolet light
3	Johnson County Wastewater-Turkey Creek	Mission	KS	Wastewater	Chlorine gas	0.90	10,201	Ultraviolet light
3	Johnson County Wastewater - Middle Basin	Overland Park	KS	Wastewater	Chlorine gas	0.90	7,041	Ultraviolet light
3	Johnson County Wastewater-75th Street Pump Station	Overland Park	KS	Wastewater	Chlorine gas	0.90	12,104	Ultraviolet light
4	Sewage Treatment Plant No. 2	Wichita	KS	Wastewater	Chlorine gas	3.00	18,000	Ultraviolet light
2	Topeka KS - N. Topeka Wastewater Treatment Plant	Topeka	KS	Wastewater	Sulfur dioxide gas	3.10	39,000	Liquid bleach
4	Fort Thomas Filtration Plant	Fort Thomas	KY	Drinking water	Chlorine gas	2.60	47,706	Liquid bleach
2	RWRA East Wastewater Treatment Plant	Owensboro	KY	Wastewater	Chlorine gas	3.00	27,750	Liquid bleach
2	Waste Water Treatment Plant, West	Owensboro	KY	Wastewater	Chlorine gas	25.00	90,000	Liquid bleach
4	Dry Creek Wastewater Treatment Plant	Erlanger	KY	Wastewater	Chlorine gas	1.30	5,900	Liquid bleach
5	London Wastewater Treatment Plant	London	KY	Wastewater	Chlorine gas	4.60	18,238	Ultraviolet light
2	Shelbyville Municipal Wastewater Treatment Plant	Shelbyville	KY	Wastewater	Chlorine gas	2.63	12,000	Ultraviolet light
1	Franklin Water Treatment Plant	Franklin	KY	Drinking water	Chlorine gas	0.90	3,100	Liquid bleach
4	Lucas Waste Water Treatment Plant	Shreveport	LA	Wastewater	Chlorine gas	0.90	726	Ultraviolet light
4	North Regional Wastewater Treatment Plant	Shreveport	LA	Wastewater	Chlorine gas	0.90	726	Ultraviolet light
7	City of Sulphur Regional Wastewater Facility	Westlake	LA	Wastewater	Chlorine gas	5.40	43,000	Ultraviolet light
2	Bridge City Wastewater Treatment Plant	Bridge City	LA	Wastewater	Chlorine gas	1.30	5,183	Liquid bleach
1	Jefferson Parish East Bank WWTP	Harahan	LA	Wastewater	Chlorine gas	12.00	790,000	Liquid bleach
2	Marrero Wastewater Treatment Plant	Marrero	LA	Wastewater	Chlorine gas	1.30	22,600	Liquid bleach
3	Thibodaux Water Plant	Thibodaux	LA	Drinking water	Chlorine gas	2.63	21,766	Liquid bleach
5	City of Ruston - Wastewater Treatment Plant	Ruston	LA	Wastewater	Chlorine gas	1.30	470	Ultraviolet light
5	Water Pollution Control Center	Monroe	LA	Wastewater	Chlorine gas	4.49	14,738	Ultraviolet light
3	Destrehan Wastewater Treatment Plant	Destrehan	LA	Wastewater	Chlorine gas	1.30	1,528	Ultraviolet light
3	Houma Water Treatment Plant #2	Houma	LA	Drinking water	Chlorine gas	1.30	2,100	Liquid bleach
1	Pittsfield Wastewater Treatment Facility	Pittsfield	MA	Wastewater	Chlorine gas	1.30	9,300	Liquid bleach
3	City of Attleboro Wastewater Treatment Plant	Attleboro	MA	Wastewater	Chlorine gas	3.00	67,026	Liquid bleach
4	High Hill Chlorination Building	Dartmouth	MA	Drinking water	Chlorine gas	2.90	7,300	Liquid bleach
5	Lawrence Water Filtration Plant	Lawrence	MA	Drinking water	Chlorine gas	1.20	13,000	Chlorine dioxide/bleach/UV
1	Holyoke Water Pollution Control Facility	Holyoke	MA	Wastewater	Chlorine gas	1.30	27,568	Liquid bleach
5	Lowell Regional Water Utility Intake Station	Lowell	MA	Drinking water	Chlorine gas	1.30	7,552	Chorine dioxide
5	Lowell Regional Water Utility Treatment Plant	Lowell	MA	Drinking water	Chlorine gas	1.30	10,382	Chlorine dioxide/bleach
5	Letchworth Avenue Wastewater Treatment Facility	No. Billerica	MA	Wastewater	Chlorine gas	1.30	7,500	Liquid bleach
4	Quittacas Water Treatment Plant	Rochester	MA	Drinking water	Chlorine gas	2.90	4,000	Liquid bleach
3	Annapolis Water Reclamation Facility	Annapolis	MD	Wastewater	Sulfur dioxide gas	2.90	23,000	Sodium bisulfite/bleach
1	Arnold WTP	Arnold	MD	Drinking water	Chlorine gas	2.70	31,100	Liquid bleach
5	Broadwater Water Reclamation Facility	Churchton	MD	Wastewater	Sulfur dioxide gas	2.90	5,000	Ultraviolet light
3	Crofton Meadows II Water Plant	Crofton	MD	Drinking water	Chlorine gas	2.70	17,500	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
3	Patuxent Water Reclamation Facility	Crofton	MD	Wastewater	Sulfur dioxide gas	2.90	25,000	Ultraviolet light
7	Ashburton Filtration Plant	Baltimore	MD	Drinking water	Chlorine gas	3.20	338,837	Liquid bleach
2	Back River Wastewater Treatment Facility	Baltimore	MD	Wastewater	Chlorine gas	14.00	1,470,000	Liquid bleach
6	City of Westminster Weastewater plant	Westminster	MD	Wastewater	Chlorine gas	0.90	3,259	Liquid bleach
5	Mattawoman Wastewater Treatment Plant	LaPlata	MD	Wastewater	Sulfur dioxide gas	5.40	94,500	Ultraviolet light
1	Cambridge WWTF	Cambridge	MD	Wastewater	Sulfur dioxide gas	1.30	6,300	Sodium bisulfite/bleach
8	Seneca Wastewater Treatment Plant	Germantown	MD	Wastewater	Chlorine gas	1.30	7,759	Ultraviolet light
5	Piscataway Wastewater Treatment Plant	Accokeek	MD	Wastewater	Sulfur dioxide gas	3.10	20,000	Ultraviolet light
5	Western Branch Wastewater Treatment Plant	Upper Marlboro	MD	Wastewater	Sulfur dioxide gas	3.10	7,322	Ultraviolet light
2	Lake Auburn Intake Facility	Auburn	ME	Drinking water	Chlorine gas	1.30	1,157	Liquid bleach
2	Lewiston-Auburn Water Pollution Control Authority	Lewiston	ME	Wastewater	Chlorine gas	1.30	10,300	Liquid bleach
1	East End Wastewater Treatment Plant	Portland	ME	Wastewater	Chlorine gas	3.00	64,411	Liquid bleach
1	Sebago Lake Water Treatment Facility	Standish	ME	Drinking water	Chlorine gas	3.00	3,956	Liquid bleach/ozone
6	Benton Harbor-St. Joseph Joint WWTP	Saint Joseph	MI	Wastewater	Chlorine gas	1.30	16,000	Liquid bleach
7	CBPU Waste Water Treatment Plant	Coldwater	MI	Wastewater	Chlorine gas	0.10	0	Ultraviolet light
1	Petoskey Wastewater Treatment Plant	Petoskey	MI	Wastewater	Chlorine gas	1.30	1,900	Liquid bleach
6	Kalamazoo Water Reclamation Plant	Kalamazoo	MI	Wastewater	Chlorine gas	1.30	17,300	Liquid bleach
3	City of Grand Rapids Wastewater Treatment Plant	Grand Rapids	MI	Wastewater	Chlorine gas	1.30	15,873	Ultraviolet light
3	City of Grandville Wastewater Treatment Plant	Grandville	MI	Wastewater	Chlorine gas	1.30	2,900	Ultraviolet light
7	City of Adrian, MI - Wastewater Treatment Plant	Adrian	MI	Wastewater	Chlorine gas	3.00	28,679	Ultraviolet light
7	City of Adrian, MI - Water Treatment Plant	Adrian	MI	Drinking water	Chlorine gas	3.00	25,922	Liquid bleach
15	City of Monroe Water Filtration Plant	Monroe	MI	Drinking water	Chlorine gas	1.50	18,000	Liquid bleach
2	Muskegon Heights Water Filtration Plant	Norton Shores	MI	Drinking water	Chlorine gas	3.00	32,000	Liquid bleach
2	Donald K. Shine Water Treatment Plant	Holland	MI	Drinking water	Chlorine gas	0.90	1,500	Liquid bleach
2	Holland Wastewater Treatment Plant	Holland	MI	Wastewater	Chlorine gas	1.30	16,000	Liquid bleach
10	City of Port Huron Wastewater Treatment Plant	Port Huron	MI	Wastewater	Chlorine gas	1.00	13,000	Liquid bleach
10	City of Port Huron Water Treatment Plant	Port Huron	MI	Drinking water	Chlorine gas	1.00	7,700	Liquid bleach
15	Ypsilanti Community Ultilities Authority	Ypsilanti	MI	Wastewater	Chlorine gas	1.30	10,613	Ultraviolet light
13	Wyandotte Wastewater Treatment Facility	Wyandotte	MI	Wastewater	Chlorine gas	14.00	1,100,000	Ultraviolet light
1	Mankato Wastewater Treatment Plant	Mankato	MN	Wastewater	Chlorine gas	1.30	10,933	Liquid bleach
2	Seneca Wastewater Treatment Plant	Eagan	MN	Wastewater	Sulfur dioxide gas	1.90	22,793	Sodium bisulfite/bleach
2	Metropolitan Council - Empire WWTP	Farmington	MN	Wastewater	Sulfur dioxide gas	1.90	1,664	Ultraviolet light
2	Metropolitan Council - Hastings WWTP	Hastings	MN	Wastewater	Chlorine gas	1.70	11,504	Liquid bleach
2	Metropolitan Council - Rosemount WWTP	Rosemount	MN	Wastewater	Chlorine gas	1.70	351	Ultraviolet light
8	Grand Rapids Waste Water Treatment Plant	Grand Rapids	MN	Wastewater	Chlorine gas	1.30	748	Liquid bleach
7	Hutchinson Wastewater Treatment Facility	Hutchinson	MN	Wastewater	Chlorine gas	3.00	12,882	Ultraviolet light
7	Hutchinson Water Treatment Plant	Hutchinson	MN	Drinking water	Chlorine gas	1.30	4,641	Liquid bleach
4	Metropolitan Wastewater Treatment Plant	St. Paul	MN	Wastewater	Chlorine gas	7.50	520,000	Liquid bleach
8	Western Lake Superior Sanitary District	Duluth	MN	Wastewater	Chlorine gas	10.32	128,293	Liquid bleach
2	Cottage Grove Wastewater Treatment Plant	Cottage Grove	MN	Wastewater	Chlorine gas	1.70	3,100	Ultraviolet light
6	Liberty Water Treatment Plant	Liberty	MO	Drinking water	Chlorine gas	1.30	2,250	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
7	Northwest Treatment Plant	Springfield	MO	Wastewater	Chlorine gas	2.20	1,500	Ultraviolet light
7	Missouri American Water Company Blendville Plant	Joplin	MO	Drinking water	Chlorine gas	1.30	14,006	Liquid bleach
6	Maryville Water Treatment Plant	Maryville	MO	Drinking water	Chlorine gas	3.00	6,850	Liquid bleach
2	City of O'Fallon Wastewater Treatment Plant	O'Fallon	MO	Wastewater	Chlorine gas	2.20	16,500	Ultraviolet light
2	Fenton Wastewater Treatment Plant	Fenton	MO	Wastewater	Chlorine gas	1.30	4,994	Ultraviolet light
2	Grand Glaize Treatment Plant	Valley Park	MO	Wastewater	Chlorine gas	1.30	10,000	Liquid bleach
4	Laurel WWTP #1	Laurel	MS	Wastewater	Chlorine gas	1.30	500	Ultraviolet light
4	WWTP #2	Laurel	MS	Wastewater	Chlorine gas	1.30	800	Ultraviolet light
2	City of Vicksburg Wastewater Treatment Facility	Vicksburg	MS	Wastewater	Chlorine gas	3.00	4,760	Liquid bleach
2	City of Vicksburg, Water Treatment Facility	Vicksburg	MS	Drinking water	Chlorine gas	2.20	3,417	Liquid bleach
1	Havre Water Plant	Havre	MT	Drinking water	Chlorine gas	2.60	10,000	Liquid bleach
1	Missouri River Treatment Plant	Helena	MT	Drinking water	Chlorine gas	2.31	1,000	Liquid bleach
1	Colstrip Water Treatment Plant	Colstrip	MT	Drinking water	Chlorine gas	1.00	1,500	Liquid bleach
13	Ed Thomas Water Treatment Plant	Burlington	NC	Drinking water	Chlorine gas	1.30	8,400	Liquid bleach
10	Catawba River Water Filtration Plant	Morganton	NC	Drinking water	Chlorine gas	2.64	15,367	Liquid bleach
2	Cross Creek Water Reclamation Facility	Fayetteville	NC	Wastewater	Chlorine gas	0.09	0	Liquid bleach
7	Rockfish Creek Water Reclamation	Fayetteville	NC	Wastewater	Chlorine gas	0.09	0	Liquid bleach
4	Brown Water Treatment Plant	Durham	NC	Drinking water	Chlorine gas	1.30	1,400	Liquid bleach
4	Williams Water Treatment Plant	Durham	NC	Drinking water	Chlorine gas	1.30	9,800	Liquid bleach
13	City of Oxford Wastewater Treatment Plant	Oxford	NC	Wastewater	Chlorine gas	1.30	2,664	Ultraviolet light
2	A.B.Uzzle, Jr. Water Plant	Erwin	NC	Drinking water	Chlorine gas	0.90	3,100	Liquid bleach
2	City of Sanford Water Treatment Plant	Sanford	NC	Drinking water	Chlorine gas	0.90	72	Liquid bleach
10	City of Lincolnton Waste Water Treatment Plant	Lincolnton	NC	Wastewater	Chlorine gas	3.00	5,000	Liquid bleach
12	Irwin Creek Wastewater Treatment Plant	Charlotte	NC	Wastewater	Chlorine gas	1.30	4,700	Ultraviolet light
9	Sugar Creek Wastewater Treatment Plant	Charlotte	NC	Wastewater	Chlorine gas	1.30	13,200	Ultraviolet light
6	City of Kannapolis Water Treatment Plant	Kannapolis	NC	Drinking water	Chlorine gas	3.00	12,770	Liquid bleach
2	Town of Garner WWTP Facility	Garner	NC	Wastewater	Chlorine gas	1.33	205	Calcium hypochlorite
2	132nd & Harney Pump Station	Omaha	NE	Drinking water	Chlorine gas	2.60	39,000	Liquid bleach
2	Maple Road Pump Station	Omaha	NE	Drinking water	Chlorine gas	2.60	17,000	Liquid bleach
2	Missouri River Wastewater Treatment Plant	Omaha	NE	Wastewater	Chlorine gas	1.30	9,400	Liquid bleach
2	Rainwood Pump Station	Omaha	NE	Drinking water	Chlorine gas	2.60	11,000	Liquid bleach
2	Skyline Pump Station	Omaha	NE	drinking water	Chlorine gas	2.60	2,700	Liquid bleach
2	Turner Boulevard Pump Station	Omaha	NE	Drinking water	Chlorine gas	2.60	93,000	Liquid bleach
2	Walnut Hill Pump Station	Omaha	NE	Drinking water	Chlorine gas	2.60	104,000	Liquid bleach
1	Northeast Wastewater Treatment Facility	Lincoln	NE	Wastewater	Chlorine gas	1.30	350	Ultraviolet light
1	Theresa Street Wastewater Treatment Facility	Lincoln	NE	Wastewater	Chlorine gas	1.30	8,100	Ultraviolet light
1	City of Norfolk WPC	Norfolk	NE	Wastewater	Chlorine gas	1.30	6,100	Ultraviolet light
2	78th & Harrison Pump Station	LaVista	NE	Drinking water	Chlorine gas	2.60	60,000	Liquid bleach
2	36th & Edna Pump Station	Omaha	NE	Drinking water	Chlorine gas	2.60	59,000	Liquid bleach
9	Bergen County Utilities Authority	Little Ferry	NJ	Wastewater	Chlorine gas	0.90	6,800	Liquid bleach
12	River Road Plant Chlorination and De-Chlorination	Princeton	NJ	Wastewater	Chlorine gas	2.20	24,078	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
6	Carl J. Olsen Water Treatment Plant	Edison	NJ	Drinking water	Chlorine gas	0.15	0	Liquid bleach
6	Middlesex County Utilities Authority	Sayreville	NJ	Wastewater	Chlorine gas	35.60	10,740,000	Liquid bleach
8	Little Falls Water Treatment Plant	Totowa	NJ	Drinking water	Chlorine gas	5.40	430,000	Liquid bleach
5	Chemical Building/ Filtration Plant	Wanaque	NJ	Drinking water	Chlorine gas	1.30	6,000	Liquid bleach
5	Lower Gate House	Wanaque	NJ	Drinking water	Chlorine gas	1.30	7,223	Liquid bleach
5	Old (Original) Treatment Plant	Wanaque	NJ	Drinking water	Chlorine gas	1.30	5,573	Liquid bleach
7	Somerset Raritan Valley Sewerage Authority (SRVSA)	Bridgewater	NJ	Wastewater	Chlorine gas	1.30	6,500	Liquid bleach
13	Edward P. Decher Secondary Wastewater Trmt. Plant	Elizabeth	NJ	Wastewater	Chlorine gas	14.00	50,000	Liquid bleach
13	Wastewater Treatment Plant (TCPA ID No. 1903)	Linden	NJ	Wastewater	Chlorine gas	1.30	10,000	Ultraviolet light
2	Truckee Meadows Water Reclamation Facility	Reno	NV	Wastewater	Chlorine gas	5.40	113,000	Liquid bleach
24	City of Auburn Water Purification Plant	Auburn	NY	Drinking water	Chlorine gas	1.30	8,500	Liquid bleach
22	City of Poughkeepsie Water Pollution Control Plant	Poughkeepsie	NY	Wastewater	Chlorine gas	1.30	9,400	Liquid bleach
19	Poughkeepsies' Water Treatment Facility	Poughkeepsie	NY	Drinking water	Chlorine gas	2.60	15,907	Liquid bleach
27	ECSD #2 - Big Sister Creek WWTP	Angola	NY	Wastewater	Chlorine gas	2.70	8,789	Liquid bleach
27	Erie County Southtowns WWTP	Buffalo	NY	Wastewater	Chlorine gas	2.70	32,983	Liquid bleach
27	ECSD #6 - Lackawanna WWTP	Lackawanna	NY	Wastewater	Chlorine gas	2.70	54,157	Liquid bleach
28	City of Niagara Falls Wastewater Treatment Plant	Niagara Falls	NY	Wastewater	Chlorine gas	25.00	1,100,000	Liquid bleach
24	Oneida County Water Pollution Control Plant	Utica	NY	Wastewater	Chlorine gas	1.30	13,500	Liquid bleach
25	Marcellus Water Treatment Plant	Marcellus	NY	Drinking water	Chlorine gas	3.00	5,367	Liquid bleach
25	Otisco Lake Metering Station	Marietta	NY	Drinking water	Chlorine gas	3.00	2,327	Liquid bleach
22	City of Newburgh Water Filtration Plant	Newburgh	NY	Drinking water	Chlorine gas	1.30	7,500	Liquid bleach
19	Peekskill Wastewater Treatment Plant	Peekskill	NY	Wastewater	Chlorine gas	1.30	14,300	Liquid bleach
18	Port Chester Wastewater Treatment Plant	Port Chester	NY	Wastewater	Chlorine gas	1.30	22,600	Liquid bleach
8	Middletown Wastewater Treatment Plant	Middletown	OH	Wastewater	Chlorine gas	2.60	21,000	Liquid bleach
2	Clermont County Lower East Fork WWTP	Milford	OH	Wastewater	Chlorine gas	2.60	2,500	Ultraviolet light
6	East Liverpool Water Department	East Liverpool	OH	Drinking water	Chlorine gas	2.60	25,500	Liquid bleach
11	Baldwin Water Treatment Plant	Cleveland	OH	Drinking water	Chlorine gas	1.30	38,300	Liquid bleach
11	Nottingham Water Treatment Plant	Cleveland	OH	Drinking water	Chlorine gas	14.00	1,100,000	Liquid bleach
5	Defiance Water Treatment Plant	Defiance	OH	Drinking water	Chlorine gas	1.30	4,000	Liquid bleach
15	Dublin Road Water Plant	Columbus	OH	Drinking water	Chlorine gas	1.30	17,015	Liquid bleach
15	Jackson Pike Wastewater Treatment Plant	Columbus	OH	Wastewater	Chlorine gas	3.00	57,000	Liquid bleach
7	Southerly Wastewater Treatment Plant	Lockbourne	OH	Wastewater	Chlorine gas	3.10	4,600	Liquid bleach
7	Xenia Ford Road Wastewater Treatment Plant	Xenia	OH	Wastewater	Chlorine gas	2.20	6,510	Ultraviolet light
7	Xenia Glady Run Wastewater Treatment Plant	Xenia	OH	Wastewater	Chlorine gas	2.20	4,100	Ultraviolet light
1	Mill Creek WWTP	Cincinnati	OH	Wastewater	Chlorine gas	14.00	860,000	Liquid bleach
1	Muddy Creek WWTP	Cincinnati	OH	Wastewater	Chlorine gas	1.30	2,300	Liquid bleach
2	Polk Run WWTP	Loveland	OH	Wastewater	Chlorine gas	1.30	6,800	Ultraviolet light
4	City of Findlay Water Pollution Control Center	Findlay	OH	Wastewater	Chlorine gas	1.30	13,000	Ultraviolet light
4	City of Findlay Water Treatment Plant	Findlay	OH	Drinking water	Chlorine gas	1.30	15,000	Liquid bleach
6	City of Steubenville, Wastewater Treatment Plant	Steubenville	OH	Wastewater	Chlorine gas	0.70	3,000	Liquid bleach
14	Aqua Ohio Inc. Lake Shore Division	Mentor on the Lake	OH	Drinking water	Chlorine gas	1.50	15,738	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
14	Lake County Water Treatment West	Willoughby	OH	Drinking water	Chlorine gas	1.90	19,792	Liquid bleach
12	Newark Water Treatment Plant	Newark	OH	Drinking water	Chlorine gas	3.00	37,000	Liquid bleach
9	Maumee River Wastewater Treatment Plant	Waterville	OH	Wastewater	Chlorine gas	1.30	1,500	Ultraviolet light
8	Celina Water Treatment Plant	Celina	OH	Drinking water	Chlorine gas	1.30	7,129	Liquid bleach
17	Akron Water Supply Plant	Kent	OH	Drinking water	Chlorine gas	14.00	411,356	Liquid bleach
17	Streetsboro-Hudson WWTP	Streetsboro	OH	Wastewater	Chlorine gas	6.88	15,091	Liquid bleach
2	City of Portsmouth Water Treatment Plant	Portsmouth	OH	Drinking water	Chlorine gas	1.30	5,798	Liquid bleach
17	Warren Water Filtration Plant	Cortland	OH	Drinking water	Chlorine gas	1.30	2,740	Liquid bleach
18	City of Dover Wastewater Treatment Plant	Dover	OH	Wastewater	Chlorine gas	0.90	2,900	Ultraviolet light
5	City of Bowling Green Water Treatment	Bowling Green	OH	Drinking water	Chlorine gas	1.30	580	Liquid bleach
4	City of Lawton Wastewater Treatment Plant	Lawton	OK	Wastewater	Sulfur dioxide gas	3.10	3,500	Ultraviolet light
4	City of Lawton Water Treatment Plant	Medicine Park	OK	Drinking water	Chlorine gas	3.50	500	Liquid bleach
2	Broken Bow Water Treatment Plant	Hochatown	OK	Drinking water	Chlorine gas	0.90	10	Liquid bleach
5	Bethany Water Plant	Bethany	OK	Drinking water	Chlorine gas	1.20	2,851	Liquid bleach
3	Clackamas River Water WTP	Clackamas	OR	Drinking water	Chlorine gas	1.30	8,900	Liquid bleach
4	City of Myrtle Creek Wastewater Treatment Plant	Myrtle Creek	OR	Wastewater	Chlorine gas	3.50	7,200	Ultraviolet light
4	Winston-Green Wastewater Treatment Facility	Roseburg	OR	Wastewater	Chlorine gas	12.00	10,000	Liquid bleach
2	Big Butte Springs	Butte Falls	OR	Drinking water	Chlorine gas	0.90	20	Liquid bleach
2	Robert A. Duff Water Treatment Plant	White City	OR	Drinking water	Chlorine gas	2.20	330	Liquid bleach
4	Albany Wastewater Plant	Albany	OR	Wastewater	Chlorine gas	5.20	46,899	Liquid bleach
4	Albany Water Plant	Albany	OR	Drinking water	Chlorine gas	1.60	17,296	Liquid bleach
5	Willow Lake Wastewater Treatment Plant	Salem	OR	Wastewater	Chlorine gas	3.00	15,585	Liquid bleach
5	Geren Island Treatment Facility	Stayton	OR	Drinking water	Chlorine gas	3.00	2,600	Liquid bleach
5	Franzen Reservoir Disinfection System	Turner	OR	Drinking water	Chlorine gas	3.00	4,900	Liquid bleach
3	Columbia Boulevard Wastewater Treatment Plant	Portland	OR	Wastewater	Chlorine gas	5.60	157,500	Liquid bleach
6	Joint Municipal Authority of Wyomissing Valley	Reading	PA	Wastewater	Chlorine gas	2.00	64,000	Liquid bleach
9	Tyrone Wastewater Treatment Plant	Tyrone	PA	Wastewater	Chlorine gas	0.90	150	Ultraviolet light
8	Chalfont-New Britain Township Jt Sewage Authority	Doylestown	PA	Wastewater	Chlorine gas	0.90	1,000	Ultraviolet light
8	Pennridge Wastewater Treatment Authority WWTP	Sellersville	PA	Wastewater	Chlorine gas	1.30	9,789	Ultraviolet light
5	St. Marys Wastewater Treatment Plant	St. Marys	PA	Wastewater	Chlorine gas	1.30	770	Ultraviolet light
15	Northampton Borough Municipal Authority WTP	Whitehall	PA	Drinking water	Chlorine gas	3.00	33,725	Liquid bleach
11	Mountaintop Area Joint Sanitary Authority	Mountaintop	PA	Wastewater	Chlorine gas	1.30	1,046	Ultraviolet light
11	GHJSA Wastewater Treatment Facility	West Hazleton	PA	Wastewater	Chlorine gas	1.30	3,700	Ultraviolet light
10	Williamsport Sanitary Authority - West Plant	Williamsport	PA	Wastewater	Chlorine gas	2.60	38,000	Liquid bleach
7	Matsunk Water Pollution Control Center	Bridgeport	PA	Wastewater	Chlorine gas	1.30	14,361	Liquid bleach
7	Oaks Wastewater Treatment Facility	Oaks	PA	Wastewater	Chlorine gas	2.04	13,300	Liquid bleach
6	ENPWJSA WWTP	Plymouth Meeting	PA	Wastewater	Chlorine gas	1.87	40,414	Liquid bleach
15	Easton Area Joint Sewer Authority WPCF	Easton	PA	Wastewater	Chlorine gas	1.30	8,735	Liquid bleach
10	City of Sunbury Wastewater Treatment Facility	Sunbury	PA	Wastewater	Chlorine gas	3.50	20,400	Ultraviolet light
2	Belmont Water Treatment Plant	Philadelphia	PA	Drinking water	Chlorine gas	1.70	49,670	Liquid bleach
13	Northeast Water Pollution Control Plant	Philadelphia	PA	Wastewater	Chlorine gas	7.30	1,575,971	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
13	Samuel S. Baxter Water Treatment Plant	Philadelphia	PA	Drinking water	Chlorine gas	7.30	787,271	Liquid bleach
1	Southeast Water Pollution Control Plant	Philadelphia	PA	Wastewater	Chlorine gas	7.30	1,182,741	Liquid bleach
12	Authority of the Borough of Charleroi	Charleroi	PA	Wastewater	Chlorine gas	1.30	3,450	Liquid bleach
2	Warwick Wastewater Treatment Facility	Warwick	RI	Wastewater	Chlorine gas	0.90	100	Liquid bleach
1	Water Pollution Control	Newport	RI	Wastewater	Chlorine gas	1.30	14,460	Liquid bleach
1	Pawtucket Water Purification Facility	Cumberland	RI	Drinking water	Chlorine gas	3.00	122,000	Liquid bleach/UV (new plant)
1	Woonsocket Regional Wastewater Commission	Woonsocket	RI	Wastewater	Sulfur dioxide gas	0.90	5,700	Sodium bisulfite/bleach
2	Quonset Point Wastewater Treatment Facility	North Kingstown	RI	Wastewater	Chlorine gas	3.00	12,200	Liquid bleach
3	Lake Hartwell Filter Plant	Anderson	SC	Drinking water	Chlorine gas	1.30	1,500	Liquid bleach
3	Middle Branch WWTP	Easley	SC	Wastewater	Chlorine gas	0.90	137	Ultraviolet light
6	North Charleston Sewer District WWTP Herbert Site	Charleston	SC	Wastewater	Chlorine gas	14.00	365,213	Ultraviolet light
1	Plum Island WWTP	Charleston	SC	Wastewater	Chlorine gas	1.40	7,500	Liquid bleach
6	City of Johnsonville Wastewater Treatment Plant	Johnsonville	SC	Wastewater	Chlorine gas	3.00	2,600	Liquid bleach
4	Lower Reedy Plant	Fountain Inn	SC	Wastewater	Chlorine gas	1.30	200	Ultraviolet light
4	WCRSA Mauldin Road Plant	Greenville	SC	Wastewater	Chlorine gas	0.90	4,000	Ultraviolet light
4	Pelham WWTP	Greer	SC	Wastewater	Chlorine gas	1.90	4,000	Ultraviolet light
4	Gilder Creek WWTP	Simpsonville	SC	Wastewater	Chlorine gas	1.30	720	Ultraviolet light
3	W. R. Wise Water Treatment Facility	Greenwood	SC	Drinking water	Chlorine gas	3.00	2,444	Liquid bleach
3	West Alexander WWTP	Greenwood	SC	Wastewater	Chlorine gas	1.88	3,300	Ultraviolet light
3	Wilson Creek WWTP	Greenwood	SC	Wastewater	Chlorine gas	1.88	1,800	Ultraviolet light
1	GSWSA Myrtle Beach SWTP	Myrtle Beach	SC	Drinking water	Chlorine gas	1.23	5,500	Liquid bleach
4	Durbin Creek WWTP	Fountain Inn	SC	Wastewater	Chlorine gas	1.30	1,400	Ultraviolet light
5	City of Bishopville Wastewater Treatment Facility	Bishopville	SC	Wastewater	Chlorine gas	1.50	1,300	Ultraviolet light
2	Lake Murray WTP	Lexington	SC	Drinking water	Chlorine gas	1.90	4,000	Liquid bleach
4	City of Union Water Treatment Plant	Union	SC	Drinking water	Chlorine gas	1.90	2,600	Liquid bleach
1	City of Aberdeen Wastewater Treatment Plant	Aberdeen	SD	Wastewater	Chlorine gas	3.50	15,000	Ultraviolet light
1	Wastewater Treatment Plant	Yankton	SD	Wastewater	Chlorine gas	1.30	10,000	Ultraviolet light
1	Newport Utilities Board Wastewater Treatment Plant	Newport	TN	Wastewater	Chlorine gas	3.00	9,595	Liquid bleach
1	Newport Utilities Board Water Plant	Newport	TN	Drinking water	Chlorine gas	2.20	7,321	Liquid bleach
4	City of Pulaski Wastewater Treatment Plant	Pulaski	TN	Wastewater	Chlorine gas	0.90	3,700	Ultraviolet light
3	Soddy Daisy Falling Water Utility District	Soddy Daisy	TN	Drinking water	Chlorine gas	1.30	2,000	Liquid bleach
2	First Utility District of Knox County WTP	Knoxville	TN	Drinking water	Chlorine gas	1.30	7,020	Liquid bleach
2	First Utility District of Knox County WWTP	Knoxville	TN	Wastewater	Chlorine gas	1.30	3,900	Liquid bleach
2	Knox Chapman Utility District WTP	Knoxville	TN	Drinking water	Chlorine gas	3.00	6,300	Liquid bleach
2	Northeast Knox Utility District WTP	Knoxville	TN	Drinking water	Chlorine gas	3.00	7,900	Liquid bleach
2	West Knox Utility District WTP	Knoxville	TN	Drinking water	Chlorine gas	3.00	2,600	Liquid bleach
2	West Knox Utility District WWTP	Knoxville	TN	Wastewater	Chlorine gas	3.00	1,800	Liquid bleach
8	Clarksville Water Treatment Plant	Clarksville	TN	Drinking water	Chlorine gas	1.30	2,727	Liquid bleach
6	LaVergne Water Treatment Plant	LaVergne	TN	Drinking water	Chlorine gas	1.30	3,400	Liquid bleach
6	Stones River Water Treatment Plant	Murfreesboro	TN	Drinking water	Chlorine gas	1.30	3,000	Liquid bleach
6	The Joe W. Lovell Water Quality Control Center	Murfreesboro	TN	Wastewater	Chlorine gas	0.90	5,000	Ultraviolet light

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
6	Smyrna Wastewater Treatment Plant	Smyrna	TN	Wastewater	Chlorine gas	0.50	1,250	Ultraviolet light
1	Unicoi Water Filter Plant	Unicoi	TN	Drinking water	Chlorine gas	1.10	300	Liquid bleach (converting)
4	McMinnville Wastewater Plant	McMinnville	TN	Wastewater	Chlorine gas	1.30	5,000	Liquid bleach
4	Warren County Utility District Water Treat. Plant	McMinnville	TN	Drinking water	Chlorine gas	2.90	1,200	Liquid bleach
1	Regional Waste Water Treatment Plant	Gray	TN	Wastewater	Chlorine gas	1.10	2,100	Ultraviolet light
1	Knob Creek Waste Water Plant	Johnson City	TN	Wastewater	Chlorine gas	1.10	1,700	Liquid bleach (converting)
1	Jonesborough Water Treatment Plant	Jonesborough	TN	Drinking water	Chlorine gas	2.30	3,000	Liquid bleach
20	Market Street Pumping Station	San Antonio	TX	Drinking water	Chlorine gas	2.60	109,000	Liquid bleach
22	City of Pearland Barry Rose W. W. Treatment Plant	Pearland	TX	Wastewater	Chlorine gas	4.00	46,000	Liquid bleach
22	City of Pearland Longwood Wastewater Treatment Plant	Pearland	TX	Wastewater	Chlorine gas	4.00	56,000	Liquid bleach
30	Dallas County Park Cities MUD Treatment Plant	Dallas	TX	Drinking water	Chlorine gas	1.30	8,917	Liquid bleach
26	Pecan Creek Water Reclamation Plant	Denton	TX	Wastewater	Sulfur dioxide gas	3.14	27,000	Ultraviolet light
6	Red Oak Creek Regional Wastewater System	Red Oak	TX	Wastewater	Chlorine gas	3.00	10,127	Ultraviolet light
6	City of Waxahachie Wastewater Treatment Plant	Waxahachie	TX	Wastewater	Sulfur dioxide gas	2.30	8,000	Ultraviolet light
22	City of Rosenberg - WWTP 2	Rosenberg	TX	Wastewater	Chlorine gas	3.00	28,437	Ultraviolet light
22	City Sugar Land South Wastewater Treatment Plant	Sugar Land	TX	Wastewater	Chlorine gas	1.30	6,700	Liquid bleach
22	Sugar Land Regional Sewerage System	Sugar Land	TX	Wastewater	Chlorine gas	1.30	3,298	Liquid bleach
14	Dallas Salmon Wastewater Plant	League City	TX	Wastewater	Chlorine gas	4.00	49,000	Ultraviolet light
4	Wastewater Treatment Plant	Sherman	TX	Wastewater	Chlorine gas	4.50	2,800	Ultraviolet light
2	Cypress-Klein UD Wastewater Treatment Plant	Houston	TX	Wastewater	Chlorine gas	1.30	13,000	Liquid bleach
22	Seabrook Wastewater Treatment Plant	Seabrook	TX	Wastewater	Chlorine gas	5.40	61,036	Liquid bleach
28	South Wastewater Treatment Plant	Mission	TX	Wastewater	Chlorine gas	0.90	6,000	Ultraviolet light
5	City of Terrell - Water Treatment Plant	Terrell	TX	Drinking water	Chlorine gas	2.20	7,900	Liquid bleach
25	Lakeway MUD - Wastewater Treatment Plant S-4	Lakeway	TX	Wastewater	Chlorine gas	0.40	576	Liquid bleach
1	Water Treatment Plant #3	Layton	UT	Drinking water	Chlorine gas	0.90	4,125	Liquid bleach
2	Big Cottonwood Water Treatment Facility	Salt Lake City	UT	Drinking water	Chlorine gas	0.90	1,504	Liquid bleach
3	South Valley Water Reclamation Facility	West Jordan	UT	Wastewater	Chlorine gas	4.40	131,968	Ultraviolet light
3	Springville City WWTP	Springville	UT	Wastewater	Chlorine gas	1.30	3,340	Ultraviolet light
1	Water Treatment Plant #2	Ogden	UT	Drinking water	Chlorine gas	0.90	8,475	Liquid bleach
6	Abert Water Treatment Plant	Lynchburg	VA	Drinking water	Chlorine gas	1.30	110	Liquid bleach
6	College Hill Water Treatment Plant	Lynchburg	VA	Drinking water	Chlorine gas	0.90	7,200	Liquid bleach
6	Lynchburg Regional Wastewater Treatment Facility	Lynchburg	VA	Wastewater	Chlorine gas	0.90	2,300	Liquid bleach
10	Fairfax County Water Authority - James J. Corbalis	Herndon	VA	Drinking water	Chlorine gas	0.90	5,100	Liquid bleach
10	Kenneth B. Rollins Memorial Water Filtration Plant	Leesburg	VA	Drinking water	Chlorine gas	3.00	6,000	Liquid bleach
5	Town of South Hill Regional WWTP	South Hill	VA	Wastewater	Chlorine gas	0.90	260	Ultraviolet light
3	Lee Hall Water Treatment Plant	Newport News	VA	Drinking water	Chlorine gas	1.30	7,900	Liquid bleach
6	Roanoke Regional WPCP	Roanoke	VA	Wastewater	Chlorine gas	0.92	5,200	Liquid bleach
7	Ni River Water Treatment Plant	Spotsylvania	VA	Drinking water	Chlorine gas	1.71	1,884	Liquid bleach
1	Smith Lake Water Treatment Facility	Stafford	VA	Drinking water	Chlorine gas	2.20	17,000	Liquid bleach
1	City of St. Albans Wastewater Treatment Facility	St. Albans	VT	Wastewater	Chlorine gas	0.90	3,500	Liquid bleach
4	City of Kennewick Collector Well #5	Kennewick	WA	Drinking water	Chlorine gas	1.30	7,300	Liquid bleach

Water utilities that have converted from extremely hazardous substances (continued)

Congressional district	Facility name	City	State	Industry type	Former toxic chemical	Former danger zone (miles)	Former danger zone population	New chemical or process
4	City of Kennewick Waste Water Treatment Plant	Kennewick	WA	Wastewater	Chlorine gas	1.30	7,300	Ultraviolet light
4	City of Kennewick Water Filter Plant	Kennewick	WA	Drinking water	Chlorine gas	1.30	7,300	Liquid bleach
4	Wenatchee Wastewater Treatment Plant	Wenatchee	WA	Wastewater	Chlorine gas	1.30	15,000	Ultraviolet light
9	South Treatment Plant	Renton	WA	Wastewater	Chlorine gas	9.90	650,000	Liquid bleach
1	Central Kitsap Tr. Plant	Poulsbo	WA	Wastewater	Chlorine gas	3.00	8,330	Ultraviolet light
1	Lemolo Chlorine Station, L.S. 96	Poulsbo	WA	Wastewater	Chlorine gas	3.00	3,453	Liquid bleach
9	City of Tacoma, Central Wastewater Treatment Plant	Tacoma	WA	Wastewater	Chlorine gas	1.30	5,800	Liquid bleach
2	City of Mount Vernon Wastewater Utility	Mount Vernon	WA	Wastewater	Chlorine gas	1.60	5,496	Ultraviolet light
1	City of Edmonds Wastewater Treatment Plant	Edmonds	WA	Wastewater	Chlorine gas	0.90	8,800	Liquid bleach
2	Everett Water Pollution Control Facility	Everett	WA	Wastewater	Chlorine gas	2.20	31,117	Liquid bleach
5	City of Walla Walla Wastewater Treatment Facility	Walla Walla	WA	Wastewater	Chlorine gas	1.30	5,200	Liquid bleach/UV
8	Heart of the Valley Metropolitan Sewerage District	Kaukauna	WI	Wastewater	Chlorine gas	1.33	7,365	Liquid bleach
1	Racine Utilities - Wastewater Utility	Racine	WI	Wastewater	Chlorine gas	1.30	7,600	Ultraviolet light
5	Waukesha Wastewater Treatment Plant	Waukesha	WI	Wastewater	Chlorine gas	1.30	18,000	Ultraviolet light
6	Neenah Menasha Sewerage Commission	Menasha	WI	Wastewater	Chlorine gas	5.40	54,000	Liquid bleach
6	Neenah Water Treatment Plant	Neenah	WI	Drinking water	Chlorine gas	2.60	34,000	Liquid bleach
2	City of Charleston Wastewater Treatment Plant	Charleston	WV	Wastewater	Chlorine gas	1.30	2,000	Ultraviolet light
1	Crow Creek Wastewater Facility	Cheyenne	WY	Wastewater	Chlorine gas	2.20	1,492	Ultraviolet light
1	Dry Creek Wastewater Facility	Cheyenne	WY	Wastewater	Chlorine gas	2.20	477	Ultraviolet light
1	Roundtop Water Treatment Plant	Cheyenne	WY	Drinking water	Chlorine gas	2.20	814	Calcium hypochlorite
1	Sam Hobbs Regional Wastewater Facility	Casper	WY	Wastewater	Chlorine gas	1.30	896	Ultraviolet light
1	Sheridan Water Treatment Plant	Sheridan	WY	Drinking water	Chlorine gas	1.20	1,000	Liquid bleach
1	Evanston Water Treatment Plant	Evanston	WY	Drinking water	Chlorine gas	0.90	10,903	Liquid bleach/UV

Methodology: These 554 drinking water and wastewater facilities formerly reported an extremely hazardous substance to the U.S. Environmental Protection Agency under the Risk Management Planning program. Each converted since 1999 to a safer and more secure chemical or process. Center for American Progress surveyed these converted facilities using telephone, online information, and information reported by the facilities in Risk Management Plans. Some of the facilities were identified in two previous survey reports by the Center for American Progress: "Preventing Toxic Terrorism," and "Toxic Trains and the Terrorist Threat."

Center for American Progress

Chemical Security 101

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Executive summary

Most of the nation's 101 most dangerous chemical facilities could become less attractive terrorist targets by converting to alternative chemicals or processes. Doing so would improve the safety and security of more than 80 million Americans living within range of a worst-case toxic gas release from one of these facilities, according to data compiled for this report. Millions more living near railroads and highways used for transporting hazardous chemicals would also be safer and more secure.

The Department of Homeland Security and numerous security experts have repeatedly warned that terrorists could use industrial chemicals as improvised weapons of mass destruction. Current chemical security efforts, however, are inadequate to protect workplaces and communities.

Indeed, temporary standards enacted two years ago (and set to expire in 2009) focus almost entirely on physical security measures, such as adding gates and guards. These measures, however worthy, cannot assure protection against a concerted attack, insider sabotage, or catastrophic release. Nor do they protect communities along chemical delivery routes. More than 90 percent of the 101 most dangerous facilities ship or receive their highest-hazard chemical by railcar or truck.

The only certain way to protect our communities is to remove the possibility of a toxic gas release by converting facilities to safer, more secure alternative technologies. This report identifies opportunities for conversions at the 101 most dangerous facilities, each of which threaten roughly 1 million people or more in surrounding areas. The chemicals most often posing the greatest danger at the top 101 facilities are chlorine—almost always in railcars—followed by hydrofluoric acid and sulfur chemicals.

Most of the top 101 facilities could convert to safer and more secure chemicals or processes already being used by similar facilities that do not endanger large numbers of people. In particular:

- Thirty bleach plants could remove danger to some 50 million Americans by generating chlorine on-site without rail shipment and bulk storage. This includes the Clorox Company in Los Angeles, which puts over 5.5 million people in danger.

- Fifteen water utilities could remove danger to 17 million people by converting from chlorine gas (and sometimes sulfur dioxide gas) to alternatives that include liquid bleach or ultraviolet light. This includes the Howard F. Curren wastewater plant in Tampa, Fla., which puts more than a million people in danger.

- Eight petroleum refineries could remove danger to 11 million Americans by substituting toxic hydrofluoric acid, used in refining crude oil, with sulfuric acid or emerging solid acid catalysts. This includes the ExxonMobil Corp. refinery in Chalmette, La., which puts over 1 million people in danger.

- A variety of safer, more secure alternatives are available to 21 facilities that receive chemicals by rail or truck for use in making such diverse products as oil additives, water treatment chemicals, and materials for bulletproof vests. This includes Stepan Company in Elwood, Ill., which puts 1.2 million people in danger in producing industrial and household cleaners with sulfur trioxide. Using on-site sulfur burning equipment would eliminate this danger.

In addition to the top 101, the report also identifies 202 additional high-hazard facilities that could make similar changes. Each of these facilities has some 100,000 people or more living within range of a worst-case toxic gas release (commonly called a "vulnerability zone"). Together these 303 facilities are found in 41 states and endanger a total of 110 million people.

Previous reports by the Center for American Progress show such conversions are possible. In fact, many chemical facilities have already switched to safer, more secure alternatives, and frequently they saved money doing so. While gates and guards always cost money, facilities that remove hazardous chemicals reduce their need for costly physical security. They also may reduce regulatory burdens, improve efficiency, upgrade production, and better protect workers.

Despite this opportunity, the federal government currently has no plan, program, or authority to spur removal of unnecessary catastrophic chemical hazards—or even to require chemical facilities to *examine* safer and more secure alternatives. To address these deficiencies, Congress should establish a comprehensive chemical security program rooted in identifying, developing, and leveraging the use of safer and more secure technologies. In particular, this program should:

- Require chemical facilities to assess and use feasible alternatives that reduce the potential harm of a terrorist attack
- Create financial incentives for facilities to convert by requiring liability insurance and targeting conversion funding to publicly owned facilities and first-adopters of innovative technologies
- Invest in collaborative research to identify safer, more secure alternatives

- Utilize the experience and knowledge of facility employees in security assessments, plans, and inspections
- Build the oversight capacity of government agencies and require administrative transparency to hold those agencies accountable
- Ensure equal enforcement of standards without special treatment for facilities in voluntary industry security programs
- Include all relevant industries, in particular currently exempted water utilities
- Respect the right of states to set more protective standards if federal actions won't protect communities

Safer and more secure technologies fix the root of the problem. What you don't have can't leak, or be blown up by terrorists.

Major findings

- Safer and more secure chemicals or processes could remove the worst chemical release scenario at most of the nation's 101 highest-hazard chemical facilities (See Appendix A on page 29 for the details)

- At least 90 percent of the 101 most dangerous facilities ship or receive their highest-hazard chemical in indefensible railroad tank cars or trucks

- More than 80 million Americans live within range of a catastrophic chemical release from at least one of the 101 most hazardous chemical facilities

- Solutions applicable to the top 101 facilities could improve safety and security at many other high-hazard facilities, including an additional 202 listed in this report (See Appendix B on page 35 for the details)

Background

Current temporary security standards are insufficient

Certain industrial chemicals, if released, have the potential to form a poison gas cloud that spreads over large areas, possibly over many miles. Those exposed to the gas may be severely injured or even killed. The Department of Homeland Security, for example, estimates that a major chlorine gas spill in an urban area could kill 17,500 people.[1] Because of this lethal potential, many federal agencies have warned about terrorism at chemical plants, as have chemical industry associations, labor unions, and other non-governmental organizations.[2]

The response from Congress, however, has been slow and incomplete. In October 2006, Congress enacted temporary Chemical Facility Anti-Terrorism Standards, or CFATS, which expire in October 2009. These standards lay important groundwork but leave fundamental challenges unresolved. The CFATS framework cannot ultimately lead to chemical security.

Under CFATS, the Department of Homeland Security sets performance standards that focus on physical site security and effectively end at the plant fence line. Yet 90 percent of the nation's 101 most dangerous chemical facilities ship or receive their most hazardous chemical by rail or truck. The CFATS do not require facilities to account for chemical hazards in transportation along supply or distribution chains. Spending a billion dollars—or a trillion—on plant-site security won't protect unguarded railcars and trucks that travel thousands of miles over railroads and highways. Indeed, rail workers report "a disturbing lack of security along the railroad tracks and in rail yards."[3]

The CFATS framework does not require facilities to assess safer and more secure alternatives. Rather, the focus on site security assumes a given chemical hazard is unavoidable—or a company prerogative. The CFATS actually prohibits the Department of Homeland Security from requiring facilities to consider cost-effective alternative technologies that could remove the threat of a catastrophic toxic gas release. Moreover, the standards fail to cover water utilities even though 15 are among the nation's 101 most dangerous facilities and could readily convert to alternatives.[4]

There has been legislation introduced every year since 1999 to require chemical facilities to assess safer and more secure alternatives (see box below describing recent legislation).[5] But the Bush administration, the chemical industry, and some congressional leaders have consistently opposed such measures, effectively stifling comprehensive chemical security legislation.

Replacement chemicals can substantially improve safety and security

It should not simply be assumed that a given chemical hazard is unavoidable. In many cases, chemical facilities may be able to convert to safer and more secure chemicals and processes. A previous report by the Center for American Progress identified 284 facilities in 47 states that have already made such conversions.[6] As a result, 38 million people no longer live under the threat of a major toxic gas cloud from these facilities.

Another report by the Center also identified 25 water utilities that eliminated railcar shipments of chlorine gas by converting to safer and more secure alternatives for water treatment.[7] These conversions removed the threat to 25 million Americans living in surrounding communities and millions more along rail delivery routes.

Adopting safer and more secure alternatives is the only *certain* way to prevent a catastrophic chemical release. Such measures remove the possibility of a release. By contrast, physical barriers may be destroyed by a truck bomb, evaded by insider sabotage, or otherwise defeated. Security may also be unreliable. Investigative journalists have found lax security at more than 100 chemical facilities across the country.[8]

Recent chemical security legislation

In 2006, Senator Joe Biden (D-DE) introduced S.2855/S.2920 to provide grants for water utilities that replace hazardous chlorine gas

In 2006, Senator Frank Lautenberg (D-NJ), Senator Barack Obama (D-IL), and others introduced S.2486 to require chemical facilities to thoroughly review and use safer and more secure alternatives where practicable

In 2006, the House Homeland Security Committee passed H.R.5695, a bipartisan compromise to assess and reduce, where feasible, the potential consequences of a terrorist attack. House leaders abandoned this bipartisan compromise in creating the temporary Chemical Facility Anti-Terrorism Standards, or CFATS, included in the Homeland Security Appropriations Act (Sec. 550). These standards make no structured effort to remove unnecessary chemical targets and expire in October 2009

In 2007, Congress modified the temporary CFATS program to protect the right of states to set protective standards

In March 2008, the House Homeland Security Committee, chaired by Representative Bennie Thompson (D-MS), passed the Chemical Facility Anti-Terrorism Act, H.R.5577, requiring chemical facilities to develop feasible alternative chemicals and processes that reduce the potential consequences of a terrorist attack. This bill has yet to be voted on by the full House.

For some facilities, there may be no safer, readily available substitute chemical or process. These facilities should maintain sufficient emergency mitigation systems, establish adequate buffer zone distances to surrounding populations, and act to minimize transportation risks. In particular, chemical suppliers should co-locate with chemical users where possible. At co-located facilities, chemical trucks or trains can be replaced by less hazardous local pipelines. Many facilities identified in this report represent dispersed supplier-user combinations and thus rely on roads or rails that travel through densely populated areas.

> "If we make fewer toxic products, use milder manufacturing conditions, and produce less toxic waste, we reduce the opportunities for terrorists."
>
> – National Research Council[9]

Converting to safer alternatives is affordable

The Department of Homeland Security estimates that chemical facilities will spend $1.5 billion each year on security measures under the current temporary CFATS regulations.[10] Facilities that are able to convert to safer alternatives, however, are able to avoid security costs associated with storing and transporting a high-hazard chemical.

If a facility does not have a chemical with catastrophic potential, it does not need to spend as much on guards, gates, and other security measures. Nor is such a facility subject to the requirements of the CFATS and other laws and regulations governing extremely hazardous chemicals. As a result, the facility may save money on regulatory compliance staff, permits and fees, inspections, emergency planning, and personal protective equipment for employees, among other savings.

The facility may also pay lower insurance premiums, and certainly faces lower liabilities for deaths, injuries, contamination, and property damage in the event of a major toxic gas release. High-hazard toxic gases account for just 0.3 percent of rail carloads, for example, but they carry enormous risks and potential liabilities.[11] One insurance study found that a major chlorine rail spill in an urban area could cause 10,200 fatalities and over $7 billion in damages.[12]

Indeed, converting to safer, more secure technologies may provide the most economical solution to chemical security. According to survey findings from the Center for American Progress, 76 of 226 facilities (34 percent) that recently adopted safer alternatives expected to save money as a result, and half did not anticipate any increase in costs.[13] Twenty large water utilities surveyed by the Center converted to safer disinfectants for no more than $1.50 per year per person served—or less than the cost of a bag of potato chips—and typically spent much less.[14]

Major findings

This report examines safer and more secure options at the 101 most dangerous U.S. chemical facilities, measured by the number of people in surrounding areas who live within range of a major toxic gas release. This list was developed from Risk Management Plans, or RMPs, reported by chemical facilities to the Environmental Protection Agency, as directed by the Clean Air Act. Approximately 13,600 chemical facilities currently submit an RMP.

Each RMP includes the company's assessment of potential consequences, including a worst-case scenario, of a major chemical release. This "off-site consequence analysis" is meant to help communities prevent and prepare for serious chemical spills and emergencies. The public, however, can only obtain access to this information at federal reading rooms that are subject to cumbersome access restrictions.[15]

Since RMPs include only one toxic chemical worst-case scenario, this report only investigates alternatives for each facility's most dangerous toxic chemical. This excludes other toxic chemicals used on-site—even if they also pose major emergency release hazards—as well as flammable chemicals, which typically endanger far fewer people.[16, 17]

The 101 highest-hazard facilities endanger millions of Americans

More than 80 million Americans in 30 states live within range of a catastrophic chemical release from at least one of the nation's 101 highest-hazard chemical facilities. The chemicals most commonly reported by these facilities as posing the greatest danger are chlorine gas (63 facilities), hydrofluoric acid (12 facilities), anhydrous sulfur dioxide (six facilities), and oleum or sulfur trioxide (four facilities). Just 14 chemicals comprise the worst-case scenarios at the top 101 facilities. The types of facilities that make up the 101 highest-hazard facilities include:

- Thirty rail-dependent bleach plants, which together threaten nearly 50 million Americans. Kuehne Chemical in South Kearny, N.J., for example, puts 12 million people in danger, and KIK Company in Denver puts 1.7 million people in danger.

- Fifteen water utilities that use chlorine gas or sulfur dioxide gas, which together threaten 17 million people. For example, Fiveash Water Treatment Plant in Fort Lauderdale, Fla., puts 1.5 million people in danger.

- Eight petroleum refineries that use hydrofluoric acid in turning crude oil into gasoline. These facilities threaten approximately 11 million Americans. For example, Marathon Petroleum in St. Paul Park, Minn., puts 2.2 million people in danger.

- Twenty-seven other chemical-user facilities that receive chemicals by rail or truck for use in making diverse products. Appleton Papers in West Carrollton, Ohio, for example, uses chlorine gas to bleach recycled paper, putting 1.2 million people in danger. Infineum USA in Linden, N.J., uses chlorine gas to produce oil additives, putting 4.2 million people in danger. And, Midland Resources in St. Louis, Mo., uses chlorine gas in producing water treatment chemicals, putting 1.2 million people in danger.

- Fourteen facilities that produce chemicals for distribution or further manufacturing. For example, PVS Chemical Solutions in Chicago, Ill., distributes sulfur dioxide, and Rhodia in Houston, Texas ships oleum, each putting more than 3 million people in danger nearby, plus millions more along rail or truck distribution routes.

- Five companies that solely assist in the distribution of hazardous chemicals (and do not manufacture or produce). The Olin Corporation Foote Yard in Niagara Falls, N.Y., for example, holds chlorine railcars awaiting shipment. Roughly 1 million people live within this facility's vulnerability zone.

- Two facilities that incinerate furan and other hazardous wastes. They are Clean Harbors in Deer Park, Texas, which endangers 2.4 million people, and Ross Incineration Services in Eaton Township, Ohio, which threatens 1.3 million people.

Appendix A lists each of the 101 most dangerous facilities. Appendix B lists 202 additional facilities that use similar preventable chemicals or processes, putting 30 million additional people unnecessarily in harm's way.

Rail and truck shipments magnify the hazard

Hazardous chemicals are delivered by rail and road in dangerous bulk shipments that travel through almost every major American city and town. Consider that:

- More than 90 percent of the 101 highest-hazard facilities ship or receive their most dangerous chemical in railcars or tanker trucks
- At least 80 percent of the 101 highest-hazard facilities ship or receive a toxic gas chemical (commonly called a Toxic Inhalation Hazard, or TIH) by rail

Facility-reported "vulnerability zones" only provide the number of people at risk from a catastrophic release that occurs at the facility. The facility does not provide estimates of people in danger along shipping or delivery routes. Nonetheless, it is clearly many millions based on the amount of TIH chemicals being transported and the locations of the top 101 facilities.

The Association of American Railroads is well aware of this threat and has supported efforts to find and use substitutes that get TIH chemicals off the rails.[18] The common use of railcars for on-site storage is also one reason many facilities have large vulnerability zones.[19]

Of the top 101 highest-hazard facilities, 11 ship their worst-case chemical to other facilities, 82 receive their worst-case chemical from other facilities, five solely distribute or hold chemicals without manufacturing, and three neither ship nor receive their worst-case chemical.

While this report primarily identifies changes that specific facilities can make, at least some distributors can remove major dangers by adjusting products or delivery. Two examples developed below are alternatives to bulk distribution of chlorine gas and anhydrous sulfur dioxide.

Safer and more secure alternatives are available

Safer and more secure chemicals or processes are available to most of the 101 highest-hazard chemical facilities identified in this report. Specifically, potential alternatives are available for:

- All 30 bleach plants
- All 15 water utilities
- All eight petroleum refineries
- Twenty-one of the 27 other chemical-user facilities
- Two of the five distribution-only facilities
- Both of the facilities that treat hazardous waste

This report does not identify complete alternatives for the 14 facilities that produce chemicals for distribution or further manufacturing. Alternatives, however, are plainly available for many of the end-uses to which these facilities distribute chemicals.

The alternative methods identified in this report are largely already used or under development at other facilities with similar products or processes. They typically involve using an alternate chemical or process, using the chemical in a less dangerous form (a less concentrated one, or aqueous instead of gaseous), or generating the chemical as needed on-site without storage. Other identified alternatives include co-locating chemical suppliers with users, improving inventory control, and minimizing bulk storage.

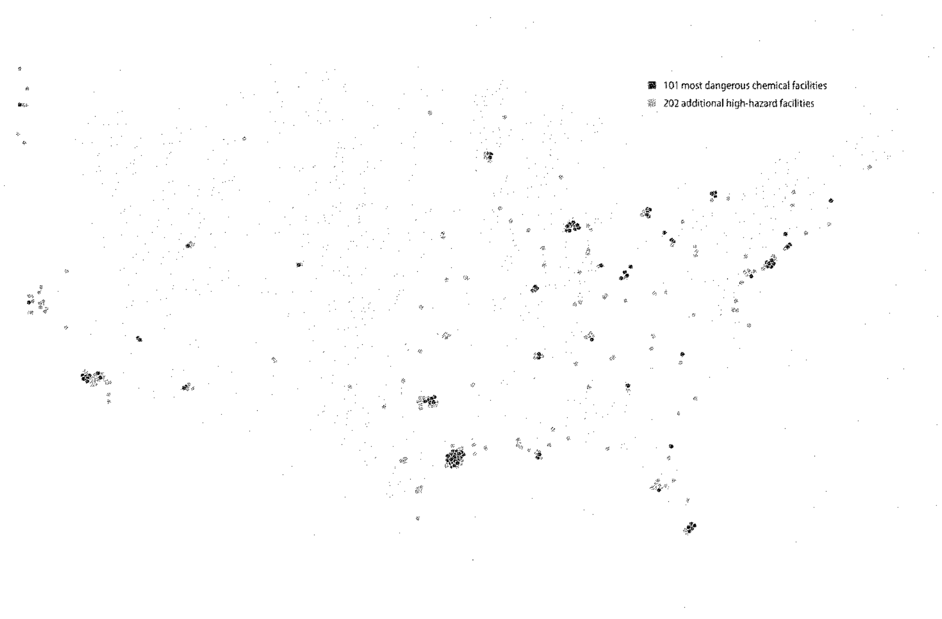
On page 12, this report examines the alternatives for each industry category represented in the top 101 facilities. Appendices A and B on pages 29 and 35, respectively, also list alternatives for individual facilities. The following are some of the opportunities discussed in this report:

- Bleach manufacturers can eliminate bulk chlorine gas by generating chlorine on-site as needed without storage
- Petroleum refineries can eliminate hydrofluoric acid alkylation by using less hazardous sulfuric acid or by developing solid acid catalysts
- Water utilities can eliminate bulk chlorine gas by using liquid bleach, ozone without storage, and ultraviolet light as appropriate
- Paper mills can eliminate bulk chlorine gas by using hydrogen peroxide, ozone, or chlorine dioxide without bulk storage
- Manufacturers of polyurethane foams can eliminate bulk ethylene oxide by substituting vegetable-based polyols
- Soap and detergent manufacturers can eliminate bulk oleum and sulfur trioxide by using sulfur burning equipment on-site
- Manufacturers of ferric chloride can eliminate bulk chlorine gas by processing scrap steel with less concentrated liquid hydrochloric acid (below 37 percent) and oxygen
- Titanium dioxide producers can eliminate bulk chlorine gas by generating chlorine on-site or using the sulfate process
- Secondary aluminum smelters can eliminate bulk chlorine gas by removing impurities with nitrogen gas injected with magnesium salts
- Power plants can eliminate bulk anhydrous ammonia gas by using cleaner combustion or by using aqueous ammonia or urea in pollution control equipment
- Wholesale chemical distributors can eliminate most bulk chlorine gas and sulfur dioxide gas by distributing alternatives such as liquid bleach and sodium bisulfite
- Pulp mills, food processors, and wastewater plants can eliminate bulk sulfur dioxide gas by, as appropriate, generating sulfur compounds on-site or purchasing sodium bisulfite, metabisulfite, hydrosulfite, or other alternatives
- Diverse manufacturers can eliminate bulk chlorine gas by generating chlorine on-site as needed, such as for fuel additives, water treatment chemicals, and aramid polymers used to make bulletproof vests

There is, of course, variability among industries as to the time, cost, and innovation needed to convert to these alternatives. Facilities that use chemicals may be able to change operations more readily than facilities that produce and distribute chemicals to others. These producer industries need solutions that satisfy user facilities and avoid transportation hazards. As users convert, however, there will be less demand to produce high-hazard chemicals and more demand to produce safer and more secure alternatives.

High-hazard chemical facilities endanger millions

This map shows the locations of the nation's 101 most dangerous chemical facilities. These facilities each threaten some one million or more Americans. An additional 202 chemical facilities are also shown. These facilities threaten some 100,000 or more people. Converting facilities to safer, more secure chemical alternatives would substantially reduce the threat of toxic terrorism.


■ 101 most dangerous chemical facilities
▨ 202 additional high-hazard facilities

Solutions for the 101 most dangerous chemical facilities

Most of the top 101 facilities could significantly improve security by switching to safer and more secure technologies already in use. These alternatives may carry dangers themselves, but they remove the risk of a catastrophic gas release that could kill or injure thousands of people.

More and better alternatives almost certainly exist than are identified in this report. But only a concerted national effort can bring to light the needed solutions across all industries. This report is a starting point—chemical security 101—that we hope will spur further development. Below is a breakdown of the 101 most dangerous chemical facilities by industry category. Safer and more secure alternatives are indicated for each category for which they are identified.

Bleach manufacturing

Thirty of the 101 highest-hazard facilities receive bulk chlorine shipments for producing liquid bleach (sodium hypochlorite). All of these facilities receive railcars of chlorine gas for use in bleach making, posing deadly hazards to communities. These manufacturers can instead produce bleach from salt and electricity on-site in a continuous "as-needed" process without ever storing chlorine gas.[20] By some estimates, converting U.S. bleach manufacturers to as-needed production could take one-third of chlorine gas railcars off the rails.[21] Converting just these 30 rail-dependent bleach manufacturers to produce bleach without storing chlorine gas would eliminate their toxic gas dangers to some 50 million people, plus more along rail delivery routes.

Of these 30 bleach-manufacturing facilities, at least half also repackage the chlorine gas into smaller containers, typically one-ton and 150-pound cylinders. A one-ton cylinder of chlorine gas is an order of magnitude less hazardous than a railcar, but still poses substantial hazards. Roughly 80 percent of one-ton and 150-pound chlorine gas cylinders shipped in the United States are used in water treatment (yet account for 4 percent or less of U.S. chlorine use). Chlorine gas, however, is not necessary for water treatment. Instead, other options are available, including liquid bleach, the most common alternative, as well as ozone and ultraviolet light. As water treatment customers convert off chlorine gas, distributors supply safer and more secure alternatives.

Examples from the Top 101 include:

- Hill Brothers Chemical, Phoenix, Ariz., 1.7 million people in danger
- Vertex Chemical, Dupo, Ill., 1 million people in danger
- JCI Jones Chemicals, Tacoma, Wash., 1.8 million people in danger
- Clorox Products, Forest Park, Ga., 1 million people in danger

Drinking water and wastewater treatment

Fifteen of the 101 highest-hazard facilities are water utilities. These 15 facilities together endanger some 17 million people. Eleven of these facilities treat drinking water using chlorine gas.[22] Chlorine disinfects water at the treatment plant and in water distribution pipes. These facilities can instead use alternate disinfectants to chlorine gas, including liquid bleach, ozone without storage, or ultraviolet light.

At least 160 large U.S. cities already use liquid bleach.[23] A previous CAP report also identified nearly 100 water plants that have converted off chlorine gas since 1999.[24] Several of the drinking water facilities in the top 101 use anhydrous ammonia gas in addition to chlorine gas. These facilities can switch from anhydrous to aqueous ammonia, which has far less potential to drift off site.

The other four water utilities are wastewater treatment plants that use both chlorine gas and sulfur dioxide gas. These water plants disinfect with chlorine gas and then remove residual chlorine with sulfur dioxide gas. Wastewater plants commonly replace chlorine gas with liquid bleach, and replace sulfur dioxide gas with sodium bisulfite, or avoid both by switching to ultraviolet light. Roughly two-thirds of large U.S. wastewater utilities already use a disinfectant other than chlorine gas or plan to stop using chlorine gas.[25]

Expert reviews convened by at least three government agencies identify chlorine gas in water treatment as a preventable security concern.[26] Some water utilities are converting off chlorine gas—pressed by requirements for chemical security, worker safety, risk management, hazard communication, emergency planning, and other obligations—but the pace of change is slow. Approximately 1,650 drinking water plants and 1,000 wastewater plants still report extremely hazardous substances, primarily chlorine gas, under the EPA's Risk Management Planning program.[27]

Examples from the top 101 include:

- Alexander Orr Water Treatment Plant, Miami, Fla., 1.6 million people in danger
- Bachman Water Treatment Plant, Dallas, Texas, 1.1 million people in danger
- Omohundro Water Treatment Plant, Nashville, Tenn., nearly 1 million people in danger
- Central Valley Water Reclamation, Salt Lake City, Utah, 1.3 million people in danger

Shifting to place-of-use chlorine production

For years, large industrial sites have produced most chlorine and used it on-site or shipped it to customers, primarily by rail. This model becomes obsolete, however, with distributed place-of-use production. Increasingly, efficient on-site units produce chlorine as needed at capacities tailored to specific uses, typically without storage. Driving this change are newer technologies, transportation costs, and security concerns. These on-site units use the same inputs—salt and electricity—and produce from 10 pounds to 100 tons or more per day for immediate use without the dangers of shipping and storing bulk chlorine gas.[28] In Europe, the amount of chlorine transported by rail and truck has been cut in half over the past decade by point-of-use production, supplier-customer relocations, and local pipelines.[29]

Petroleum refining

Eight of the 101 highest-hazard facilities are petroleum refineries that use concentrated hydrofluoric acid as an alkylation catalyst in turning crude oil into high-octane gasoline. These facilities together endanger some 11 million people. Many U.S. refineries use less hazardous sulfuric acid as an alkylation catalyst. Only about 50 of the 148 U.S. petroleum refineries use hydrofluoric acid.[30] Concentrated hydrofluoric acid is very toxic and corrosive. A major release can form a dangerous airborne plume that drifts miles downwind. A terrorist attempting to exploit hydrofluoric acid at a refinery, even if unsuccessful, could damage the facility, cost jobs, and disrupt fuel supplies.

By contrast, if spilled sulfuric acid tends to pool on the ground—a serious problem, but one that is easier to contain and prevent airborne exposure. Emerging solid acid alkylation processes also eliminate the danger of a catastrophic chemical release.[31] Some refineries may resort to less-volatile modified hydrofluoric acid, but it can still endanger people miles off-site.[32] At best, modified hydrofluoric acid is an interim step to fully remove the danger of a catastrophic chemical release.

Examples from the top 101 include:

- PDV Midwest Refining (Citgo), Lemont, Ill., 3.1 million people in danger
- Chalmette Refining (ExxonMobil), Chalmette, La., 1 million people in danger
- Marathon Petroleum, St. Paul Park, Minn., 2.2 million people in danger
- Sunoco Philadelphia Refinery, Philadelphia, Pa., 4.4 million people in danger

Pulp and paper manufacturing

One of the 101 highest-hazard facilities is a paper mill, Appleton Papers, in West Carrollton, Ohio, that uses chlorine gas to bleach recycled paper. This facility has a chlorine gas vulnerability area of 1.2 million people.

Historically, most pulp and paper mills used elemental chlorine gas, but few do so today. Alternatives are available that eliminate or reduce toxic gas hazards.[33] A few U.S. mills use totally chlorine-free bleaching, which employs an oxygen-based process with ozone or hydrogen peroxide. Many more U.S. mills use elemental chlorine free bleaching, which employs chlorine dioxide. However, like elemental chlorine gas, chlorine dioxide poses significant dangers of a toxic gas release to workers and communities.[34] These mills can nonetheless reduce the danger of a toxic gas release by using up chlorine dioxide with minimal accumulation or storage.

One paper mill, Shweitzer-Mauduit of Spotswood, N.J., recently converted its bleaching process from chlorine gas delivered by rail to chlorine dioxide generated as needed without bulk storage from a premix solution.[35] This change eliminated a chlorine gas vulnerability zone that included more than a million people. Because Shweitzer-Mauduit is a smaller mill, it can use a premix to generate chlorine dioxide without posing the danger of an off-site gas release. Larger mills usually have their own chemical facilities to produce chlorine dioxide, and can also reduce dangers by minimizing run-time storage.

Moving away from bulk distribution of sulfur dioxide

Anhydrous sulfur dioxide gas is often distributed through merchant wholesalers who receive shipments by rail for repackaging into smaller containers. This bulk distribution system poses unnecessary dangers. To avoid the safety and security hazards of sulfur dioxide gas, user companies increasingly generate sulfur chemicals on-site or purchase less hazardous forms. Industries primarily use sulfur dioxide to produce other chemicals (40 percent), bleach pulp and paper (20 percent), process food (16 percent), and treat wastewater (10 percent).[36] These major uses can be met without bulk transportation and storage of sulfur dioxide gas. Large industrial users frequently install sulfur-burning equipment and generate their own sulfur chemicals as needed.[37] Indeed, well over half of global sulfuric acid production comes from burning elemental sulfur at its place of use.[38] Smaller facilities purchase alternatives such as sodium hydrosulfite, bisulfite, or metabisulfite, depending on the application. These alternatives can be supplied by companies that never store or transport sulfur dioxide gas.[39]

Some mills may also use the toxic gas anhydrous sulfur dioxide. Sulfur dioxide gas may be brought on-site for use as a bleaching agent to remove residual hydrogen peroxide, or as a digesting agent to separate pulp from lignin. Such mills can instead use sulfur-burning equipment to generate sulfur compounds on-site, eliminating the dangers of transporting sulfur dioxide gas.

Chemical manufacturing: oleum and sulfur trioxide

Four of the 101 highest-hazard facilities ship or receive oleum or sulfur trioxide. Together these four facilities endanger more than 7 million people, plus additional millions along shipping routes.

Two of these facilities are Rhodia, in Houston, and DuPont, in North Bend, Ohio, which *produce* oleum (sulfur trioxide mixed with sulfuric acid) in regenerating spent sulfuric acid, primarily from petroleum refineries. Oleum and sulfur trioxide are optional co-products of this process when stored in bulk for use or sale. As major producers, there is no apparent single-facility alternative. Many consumer industries, however, avoid the dangers of transporting oleum or sulfur trioxide by producing sulfur compounds on-site or using alternate chemicals.

The other two facilities *receive* shipments of oleum or sulfur trioxide for further manufacturing. DuPont in Memphis receives bulk oleum shipments for use in manufacturing potassium monopersulfate, used primarily in swimming pool sanitation products. The Stepan Company in Elwood, Ill., brings in bulk shipments of sulfur trioxide to produce surfactants used in detergents, soaps, and cleaners.

These facilities could instead use on-site sulfur-burning equipment to remove the dangers of transportation and bulk storage. Case in point: Proctor and Gamble facilities in Pineville, La., and Cincinnati eliminated bulk delivery of oleum or sulfur trioxide by installing sulfur-burning equipment. The Stepan Company in fact uses such equipment at another of its locations.

Chemical distribution: sulfur dioxide gas

Three of the 101 highest-hazard facilities ship or receive anhydrous sulfur dioxide gas (other than water utilities). More than 9 million people live within range of a toxic gas release from just these three facilities, plus additional millions along transportation routes.

PVS Chemical Solutions in Chicago produces and distributes sulfur dioxide gas, sodium bisulfite, and other chemicals. JCI Jones Chemicals in Torrance, Calif., uses bulk shipments of sulfur dioxide gas in producing sodium bisulfite. And DXI Industries in Houston repackages sulfur dioxide gas from railcars to smaller cylinders for distribution.

The major distributed uses of sulfur dioxide gas can be met without bulk storage and transportation, generally by producing sulfur compounds at the point of use, or by substituting sodium hydrosulfite, bisulfite, metabisulfite, or other alternatives (see discussion of sulfur dioxide on page 15).

Fertilizer manufacturing

One of the 101 highest-hazard facilities manufactures ammonia fertilizers.[40] Agrifos Fertilizer in Pasadena, Texas, stores millions of pounds of anhydrous ammonia for use with phosphoric acid and sulfuric acid in manufacturing ammonium phosphate and ammonium thiosulfate fertilizers. More than 3 million people live within range of a worst-case ammonia gas release. As a major fertilizer producer, there is no apparent single-facility alternative; however, the facility may be able to reduce its vulnerable population by reducing ammonia gas storage.

Most commercially produced ammonia is used as fertilizer.[41] Manufacturing and distributing fertilizers commonly involves anhydrous ammonia gas. Shifting to alternative fertilizers would remove most of the distribution hazards of anhydrous ammonia. More widely used liquid nitrogen and dry urea fertilizers do not pose the emergency gas release hazards of anhydrous ammonia. Nor are they well suited for illegal methamphetamine production, a pervasive problem, or for the creation of improvised explosives. Evolving supply chain efficiency to more as-needed delivery could also help reduce anhydrous ammonia storage.

Railcar service or storage

Two of the 101 highest-hazard facilities solely support rail transportation. Rail transportation facilities only report RMP vulnerability zones when chemicals are stored or held rather than in transit. Yet railcars traverse wide-open infrastructure through every major American city, and cannot be protected.

The GATX Rail Tank Car Facility in Colton, Calif., repairs and maintains railcars, some of which may contain hazardous chemicals. This facility has more than 2 million people in its vulnerability zone in densely populated San Bernardino County. Since railcars are mobile, routine service and maintenance on the few that hold TIH chemicals can take place away from densely populated locations or when the railcars are empty. Over time, safer and more secure chemicals and processes can reduce and phase out transport of TIH chemicals.

The Olin Corporation Foote Yard in Niagara Falls, N.Y., is a facility-controlled holding yard for chlorine railcars awaiting shipment to customers. Almost a million people live within range of a chlorine gas release. As a major producer, there is no apparent single-facility alternative; however, distributed point-of-use production and alternative processes at downstream industries can remove the demand for such shipments.

Chemical shipping terminals

Two of the 101 highest-hazard facilities are terminals for ocean-going ships. Together these terminals endanger some 2.5 million people in the Houston area. These terminals store chemicals rather than manufacture or process them. The Houston Ammonia Terminal (Terra/PCS Nitrogen) receives some 350 million pounds of anhydrous ammonia gas each year, which it stores and distributes for agricultural fertilizer and industrial uses.

The Stolthaven Houston terminal holds some 14 million pounds of acrylonitrile in storage tanks for shipping or distribution. Domestic or export uses of acrylonitrile include synthetic rubber, resins, nylon, and acrylic fibers. As major shipping terminals, there is no apparent single-facility alternative apart from changes to the downstream uses of these materials.

Hazardous waste incinerators

Two of the 101 highest-hazard facilities receive and incinerate hazardous waste, including furan, which they both report as their most dangerous chemical. More than 3.7 million people live in the toxic gas vulnerability areas of these facilities (Clean Harbors in Deer Park, Texas, and Ross Incineration Services in Eaton Township, Ohio).

One clear response to this threat is to prevent pollution at the source, eliminating wastes that may otherwise be shipped to hazardous waste incinerators. Short of this, incinerator facilities can improve control of inventory to maintain extremely hazardous chemicals below amounts that pose significant reportable off-site toxic gas hazards. Other incineration facilities have already taken this step.[42]

Chemical manufacturing: ethylene oxide

Four of the 101 highest-hazard facilities produce or use ethylene oxide (oxirane) in chemical manufacturing, posing toxic gas release hazards to roughly 6 million people. Pelron in Lyons, Ill., uses ethylene oxide in producing polyols, used primarily in rigid or flexible polyurethane foams. This facility could convert from ethylene oxide. There are already a series of soy-based alternatives for producing polyols—including some made by Pelron.[43]

Akzo Nobel Surface Chemistry in Houston uses ethylene oxide in making surfactants (soaps and detergents for consumer and industrial use). Taminco in Riverview, Mich., uses ethylene oxide to produce alkanolamines that are used in diverse products such as paints, inks, fuel additives, and metal-working fluids. And Celanese in Pasadena, Texas, is a major producer of ethylene oxide for use in ethylene glycol and sale to other manufacturers. We did not identify specific alternatives for these uses of ethylene oxide.

Chemical manufacturing: ferric chloride

Three of the 101 highest-hazard facilities receive bulk shipments of chlorine gas for use in producing ferric chloride: Kemira Water Solutions in East Chicago, Ind.; PVS Technologies in Detroit; and Midland Resources in St. Louis. Just these three facilities pose toxic gas hazards to some 6.5 million people.

These facilities do not need to use chlorine gas. Instead, it is possible to produce ferrous chloride from liquid hydrochloric acid, at a concentration less than 37 percent, and scrap steel, oxidized with liquid hydrochloric acid and oxygen to ferric chloride. Below 37 percent concentration, hydrochloric acid does not readily form a toxic gas plume.

Other ferric chloride manufacturers reduce hazards by receiving chlorine through local pipelines rather than railcars.[44] Ferric chloride is primarily used to precipitate impurities during water and wastewater treatment; various competitive alternatives exist, such as aluminum sulfate.

Chemical manufacturing: titanium dioxide pigments

One of the 101 highest-hazard facilities, Millennium Chemicals Hawkins Point in Baltimore, uses chlorine gas in manufacturing titanium dioxide pigments. This process, known as the chloride process, also generates the hazardous intermediate chemical titanium tetrachloride. Some 1.4 million people live within range of a chlorine gas release from the Hawkins Point plant.

There are a couple of available safer and more secure alternatives. The facility could generate and use chlorine in a continuous process on-site without bulk storage. Or less hazardous still, the facility could rely only on sulfuric acid (sulfate process) rather than chlorine to extract titanium pigment from titanium ores. The sulfate process is a somewhat older process, yet some 70 percent of European production is by the sulfate process and 30 percent from chloride.[45]

In North America, Millennium Chemicals (Baltimore) and Kronos (Varennes, Canada) use both sulfate and chloride processes. Both processes produce waste (dioxin pollution from the chloride process is of particular concern) but only the chloride process poses the danger of a catastrophic gas release.

Chemical manufacturing: hydrofluoric acid

Four of the 101 highest-hazard facilities produce or use hydrofluoric acid (concentration 50 percent or greater) in chemical manufacturing. These facilities together pose toxic gas release dangers to approximately 8 million people.

One of these facilities, General Chemical in Pittsburgh, Calif., produces high purity electronic grade hydrofluoric acid (concentration 49 percent to 70 percent) for use by manufacturers of semiconductors and silicon wafers. Electronics manufacturers regularly use less concentrated hydrofluoric acid (less than 50 percent) in producing these products. Intel Corp., for example, does not use hydrofluoric acid above 50 percent for high-volume manufacturing. At concentrations below 50 percent, hydrofluoric acid does not have the same potential to form a dangerous toxic gas plume.

Of the three other facilities in this category, DuPont in La Porte, Texas, is a basic manufacturer of hydrofluoric acid for use in various industries; Honeywell in Claymont, Del., uses hydrofluoric acid in producing fluosulfonic acid; and Solvay Solexis' Thorofare Plant in West Deptford, N.J., uses hydrofluoric acid in producing vinylidene fluoride for diverse industrial applications. While we did not identify specific alternatives for these uses of hydrofluoric acid, less concentrated forms may replace some applications.

Chemical manufacturing: formaldehyde

Two of the 101 highest-hazard facilities use formaldehyde solution in chemical manufacturing. INVISTA in LaPorte, Texas, uses formaldehyde to produce intermediate chemicals—butanediol and tetrahydrofuran—that are used to make spandex fibers. INVISTA has more than 1.8 million people living in its vulnerability zone. Improving pipeline delivery and related storage could remove or reduce this danger. In addition, formaldehyde is not needed to produce these intermediates.

Indeed, they are more commonly made without formaldehyde.[46] Commercial processes for producing butanediol and tetrahydrofuran, which have diverse industrial uses, are evolving. Alternate methods also use hazardous substances and in some cases pose toxic gas dangers (allyl alcohol and propylene oxide). To enhance security, manufacturers should adopt those methods that avoid the use of bulk toxic inhalation hazard chemicals.

MacDermid in Ferndale, Mich., uses formaldehyde solution in making specialty chemicals, putting 1.5 million people in danger. While this paper does not identify a definitive alternative, this facility may be able to receive and store formaldehyde chilled as a gel or solid to remove or minimize the consequences of a release during transportation or use.

Chemical manufacturing: vinyl chloride

Two of the 101 highest-hazard facilities are the Oxy Vinyls VCM plants in Deer Park and La Porte, Texas, which use anhydrous hydrogen chloride in producing polyvinyl chloride (PVC). These facilities have more than 2.5 million people living within range of a worst-case chemical release.

Hydrogen chloride is a byproduct and feedstock in producing ethylene dichloride (from ethylene and chlorine), which is purified and processed to form vinyl chloride. PVC products consistently exhibit fire, health, security, and pollution hazards during manufacturing, use, or disposal. While PVC manufacturers may improve security by reducing chemical storage and transportation, catastrophic release hazards may not be removed short of conversion to substitute materials.[47] Two other top 101 facilities (counted in other industry categories) are related to PVC production; one provides chlorine and the other manufactures PVC additives.

Chemical manufacturing: chlorine producers

Four of the 101 highest-hazard facilities are major chlorine producers. Each has nearly a million or more people within range of a chlorine gas release, with millions more living alongside transportation routes. Pioneer Americas in Henderson, Nev., and Occidental Chemical and Olin Corp., both in Niagara Falls, N.Y., are merchant manufacturers of chlorine gas, caustic soda, and hydrochloric acid. The Oxy Vinyls Battleground Chlor-Alkali Plant, in La Porte, Texas, produces chlorine gas primarily for captive-use manufacturing of polyvinyl chloride at other sites.

As major producers, these facilities supply chlorine to diverse industries. As such, there is no single-facility "drop in" solution that would remove their large vulnerability zones. While alternatives to chlorine are available for almost all industrial uses, conversion would take time and costs would vary widely.[48] Yet even short of major long-term changes in chlorine industries, more limited changes can dramatically reduce the need to transport chlorine gas by rail and truck, arguably the point of greatest security vulnerability. These changes include co-locating suppliers and customers, modifying gaseous to aqueous chlorine, using local pipelines, increasing distributed place-of-use production without storage, and using feasible substitutes.

Chemical manufacturing: chlorine users

Ten of the 101 highest-hazard facilities receive chlorine gas by railcar for the manufacturing of various intermediate chemicals or products. These facilities include:

- Infineum in Linden, N.J., Afton Chemical in Sauget, Ill., and Ethyl in Houston, which produce oil and fuel additives
- AMVAC Chemical in Los Angeles and GB Biosciences in Houston, which make agricultural fungicides
- Dover Chemical in Hammond, Ind., which makes chlorinated paraffin
- Solutia in Sauget, Ill., which manufactures water treatment products
- Bayer MaterialScience in Baytown, Texas, which makes diverse industrial chemicals

- Rohm & Haas in Cincinnati, which produces PVC plastics additives
- DuPont in Deepwater, N.J., which produces phosgene for aramid polymers used in bulletproof vests

Together these facilities put more than 14 million people in harm's way of a toxic gas release. To remove their large vulnerability zones, these facilities can instead generate chlorine gas on-site as needed or with minimal storage, or co-locate with a chlorine producer by local pipeline. Bayer MaterialScience in fact does generate part of the chlorine it uses.

Chemical manufacturing: other materials

The remaining three of the 101 highest-hazard facilities produce or use other chemicals:

- Penn Specialty Chemicals (now Penn A Kem) in Memphis produces furan for sale or use in a variety of furan-based specialty chemicals
- PPG Industries in Barberton, Ohio, produces and uses phosgene in making chloroformate for optical monomers
- Arkema in Houston, Texas, produces and sells carbon disulfide as a byproduct of manufacturing hydrogen sulfide and mercaptans

We did not identify alternatives at these facilities.

Solutions for 202 additional high-hazard facilities

Appendix B on page 35 lists 202 additional facilities that can remove the possibility of a catastrophic chemical release through safer and more secure technologies. These 202 facilities endanger 30 million additional people beyond the 80 million endangered by the top 101 facilities. These facilities are listed because:

- They have 100,000 or more people living within range of a worst-case chemical release
- They have alternatives similar to the 101 highest-hazard facilities *or* alternatives to three commonly distributed gases—chlorine, sulfur dioxide, and ammonia

The industries described below do not appear in the top 101, but are included in the additional 202 because they use chlorine, sulfur dioxide, or anhydrous ammonia.

Secondary aluminum smelters

Five secondary aluminum smelters listed in Appendix B use chlorine gas in fluxing operations to remove impurities from molten aluminum. One of these, Custom Alloy Light Metals in Industry, Calif., falls just outside the 101 highest-hazard facilities (based on vulnerable population).

An alternative for secondary aluminum smelters is magnesium chloride salts injected with nitrogen gas. Kaiser Aluminum in Spokane, Wash., for example, converted off chlorine gas railcars using this alternative.

Food processors

Five food processors listed in Appendix B use anhydrous sulfur dioxide to inhibit microbes and oxidation. Four conduct wet corn milling and one manufactures sugar from beets. Food processors may also use sulfur dioxide gas in cherry brining, wine making, or other applications.

Food processors can instead generate sulfur chemicals on-site from sulfur burning equipment or can purchase alternatives such as sodium (or potassium) bisulfite or metabisulfite.

Cargill in Memphis, for example, switched from sulfur dioxide to sodium bisulfite for use in wet corn milling. The Minn-Dak Farmers Cooperative in Wahpeton, N.D., switched to generating sulfur chemicals on-site for use in beet-sugar processing.

Power plants

Thirteen power plants listed in Appendix B use anhydrous ammonia to control nitrogen oxides (NOx), a component of smog. Power plants may prevent NOx formation during combustion or use ammonia in air pollution control equipment. While some power plants use anhydrous ammonia gas, many use less hazardous aqueous ammonia or even solid urea.

Converting power plants from anhydrous to aqueous ammonia dramatically reduces the number of people in danger off-site.[49] Generating ammonia as needed from solid urea eliminates the danger of a major emergency toxic gas release. For example, six GWF Power Systems plants in California switched from anhydrous ammonia to aqueous.

Conclusion and recommendations

This report finds that most of the nation's 101 most dangerous chemical facilities could switch to safer, more secure chemicals or processes. Making these changes would significantly reduce or eliminate the threat to 80 million Americans living near these facilities and millions more living along train or truck delivery routes.

Current requirements and incentives, however, are generally inadequate to spur the adoption of safer and more secure alternatives. The temporary Chemical Facility Anti-Terrorism Standards, which expire in October 2009, do not require chemical facilities to assess and use alternatives that could remove the possibility of a catastrophic chemical release. These standards leave in place unnecessary and indefensible chemical hazards that could kill or injure thousands of people.

Incentives are needed for change. As long as chemical facilities do not internalize the full costs of security, the incentives to develop and use solutions will be deficient—no matter how great the safety and security benefits. Accordingly, the new Congress and the Obama administration should enact a comprehensive chemical security program that creates these incentives. Specifically, this program should:

- **Focus on removing unnecessary terrorist targets.** The program should direct dangerous chemical facilities to identify and develop safer, more secure chemicals and processes. Facilities should use these alternatives where cost effective, technically viable, and risk-reducing. In pushing for these conversions, the Department of Homeland Security should employ a tiered approach that gives highest priority to converting the facilities that present the greatest danger.

- **Create financial incentives for facilities to convert.** Dangerous chemical facilities should be required to carry sufficient liability insurance to cover a catastrophic chemical release. The cost of adequate insurance will create a market-based incentive for change that complements other regulations. In addition, government funding to implement safer, more secure alternatives should give priority to publicly owned facilities and first-users of innovative technologies, to help overcome the natural aversion of businesses to be the first to adopt substantial change. Federal funding should not subsidize inevitably insufficient physical security at facilities that could eliminate catastrophic chemical hazards but have no plan and timeline to do so.

- **Generate knowledge to fix the problem.** Requiring chemical facilities to identify safer and more secure alternatives in vulnerability assessments and security plans will generate awareness of alternatives, help overcome institutional inertia, and identify specific liabilities, savings, and opportunities. The program should also convene government agencies, the chemical industry, academic institutions, technology vendors, and independent experts for collaborative research to identify alternatives. In addition, DHS should develop security-assessment methodologies and auditing standards that help facilities assess the savings, costs, hazards, and technical feasibility of alternatives.

- **Utilize the experience and knowledge of workers.** Employees and their union representatives should be involved in assessing hazards, drafting plans, and participating in drills and inspections. Training and involving employees improves the outcome and validity of security activities. To promote effective collaboration, the program should protect whistleblowers from retaliation and limit background checks to security-relevant areas. Where third parties prepare assessments or plans, these parties should be qualified in process engineering to help companies identify and develop solutions that remove unnecessary chemical hazards.

- **Require government accountability.** The program should promote accountability by disclosing the status of facility assessments and plans, any fines or penalties levied, and other administrative activities. The program should not limit information that is already publicly available, readily observed, or easily discovered. Nor should it limit current obligations under other chemical safety laws. The Government Accountability Office should review and publicly report on program progress and the capacity of emergency response resources to address a worst-case chemical release.

- **Build oversight capacity.** The Department of Homeland Security, the EPA, and other agencies that have chemical security responsibilities must have the funding and capacity to work with facility operators, employees, state and local officials, and others in overseeing the program. In particular, each agency must have adequate engineering staff with expertise in intrinsically more secure design of chemical facilities.

- **Ensure equal enforcement.** Chemical companies should not receive special treatment just because they participate in voluntary industry security programs, as proposed in some recent bills before Congress. Voluntary industry programs lack oversight and are inherently unenforceable. The program must have enforceable requirements for preparing assessments and plans, involving employees, and conducting inspections, among other elements. Each facility should have to comply with each requirement regardless of participation in a voluntary industry program.

- **Include all relevant facilities and activities.** The program should cover all types of facilities that pose major chemical hazards, including drinking water and wastewater plants, which are currently exempt from chemical security standards. The program should establish collaboration among government agencies to avoid regulatory redundancy, inconsistency, and gaps in supply chain analysis and oversight. Doing so will help address the spectrum of activities undertaken by chemical facilities—beyond security at the fence line—from manufacture and repackaging to transportation, storage and use.

- **Respect local control.** The program should not preempt effective state laws. The program should ensure the right of states to set more protective chemical security standards if federal actions are insufficient to protect communities.

Even prior to further action by Congress, chemical facilities and other federal agencies can take action to reduce chemical hazards. Specifically:

- The facilities listed in this report, and others that use highly hazardous processes, should make every effort to identify and use safer and more secure chemicals and processes. Where alternatives are available, these facilities should set measurable goals and timelines to eliminate the possibility of a catastrophic chemical release. Where alternatives are not identified, industries that share vulnerable technologies should collaborate in multi-stakeholder initiatives to identify safer and more secure options.

- The Surface Transportation Board should clarify by policy or regulation the ability of railroads to recover the unique costs, such as major liability insurance, of transporting toxic inhalation hazard, or TIH chemicals. Railroads are required under common carrier obligations to carry TIH shipments at reasonable rates, yet a single major release could be financially ruinous. Requiring shippers to share liability insurance costs would create a market-based incentive for chemical producers and users to adopt proven alternatives.

- The Securities and Exchange Commission and the Federal Accounting Standards Board should require chemical companies to regularly provide investors with information on financial worst-cases associated with a catastrophic chemical release, including assets at risk and potential liabilities.

- The Chemical Safety and Hazard Investigation Board should examine potential alternatives that can prevent the consequences of a chemical release as part of its root cause investigations into serious chemical releases. The consideration of safer, more secure technologies should be a standard element of the Board's incident investigations, reports, and recommendations.

Numerous security experts and the Department of Homeland Security have repeatedly warned that terrorists could use industrial chemicals as improvised weapons of mass destruction. The recommendations above take these warnings seriously. At the same time, they are reasonable and obtainable.

There is no reason that chemical facilities cannot evaluate safer and more secure alternatives and determine whether such alternatives are cost-effective. Many chemical facilities have already switched to safer, more secure alternatives. These conversions have been affordable, and in many cases have generated cost savings.

Where alternatives are viable and cost-effective, they should be implemented, particularly at facilities with extremely large vulnerability zones—like the facilities identified in this report. Taking these actions would enhance the safety and security of millions of Americans.

Appendix A

List of most dangerous 101 facilities and solutions*

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population**	Congressional Districts***
Hill Brothers Chemical Co.–Phoenix Facility 2006	Hill Brothers Chemical Co.	Phoenix	AZ	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,750,000	AZ 2--5, 7
DPC Enterprises, L.P.		Glendale	AZ	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,666,456	AZ 2--5, 7
AMVAC Chemical Corporation	American Vanguard Corporation	Los Angeles	CA	Pesticide manufacturing plant uses chlorine in chlorination of pentachloronitrobenzene, a soil fungicide.	Generate chlorine as needed without bulk storage or co-locate with an as-needed source of chlorine.	2,222,511	CA 29, 32--35, 37, 38, 39
Clorox Products Manufacturing Company	The Clorox Company	Los Angeles	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	5,552,300	CA 26, 28--40, 42, 46
JCI Jones Chemicals Inc.–Torrance		Torrance	CA	Facility uses bulk shipments of sulfur dioxide gas in producing sodium bisulfute, and bulk chlorine gas in producing liquid bleach.	Produce sodium bisulfite from sulfur-burning equipment without storing sulfur dioxide gas; produce bleach from salt and electricity without storing chlorine gas.	4,542,819	CA 30, 32--40, 46
KIK SO-CAL	KIK International	Santa Fe Springs	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	4,900,000	CA 26, 29, 31--35, 37--40, 42, 46, 47
Pioneer Americas LLCd/b/a Olin Chlor Alkali Produc	Pioneer Companies, Inc.	Santa Fe Springs	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	5,017,475	CA 26, 29, 31--35, 37--40, 42, 46, 47
Joseph Jensen Filtration Plant	Metropolitan Water District of So. California	Granada Hills	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,700,000	CA 24, 25, 27--30
Chem Lab Products, Inc.		Ontario	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	1,417,392	CA 26, 38, 41--44
GATX Rail–Colton, CA Tank Car Facility	GATX Rail Corporation	Colton	CA	Railroad tank car service center repairs, maintains, and cleans railcars; at different times railcars on-site may contain any of nearly 60 extremely hazardous substances.	Relocate routine maintenance on railcars containing toxic inhalation hazard (TIH) chemicals away from densely populated areas; over time, phase out TIH rail shipments.	2,349,000	CA 26, 38, 41--45, 49
General Chemical Bay Point Works	General Chemical West LLC/GenTek, Inc.	Pittsburg	CA	Chemical manufacturing facility produces high purity electronic grade hydrofluoric acid (concentration 49% to 70%) for use in semiconductor and silicon manufacturing industries.	Use and supply less concentrated electronic grade hydrofluoric acid (<50 percent concentration) to semiconductor and silicon manufacturers.	2,099,957	CA 3, 7, 9--11
KIK (Denver) Inc.	KIK International Inc.	Denver	CO	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	1,714,800	CO 1, 2, 6, 7
Honeywell–Delaware Plant	Honeywell International Inc.	Claymont	DE	Specialty chemical manufacturing facility uses concentrated hydrofluoric acid in producing fluosulfonic acid.	No alternative identified.	2,080,361	DE 1; NJ 1, 2; PA 1, 2, 6, 7, 16
JCI Jones Chemicals Inc.–Jacksonville		Jacksonville	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,064,810	FL 3, 4, 6, 7
John E. Preston Water Treatment Plant	Miami-Dade Water and Sewer Department	Hialeah	FL	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,893,169	FL 17, 18, 20, 21, 25

* Three additional facilities rank among the top 101, but are not included for the following reasons: Clark Refinery, Blue Island, Ill is closed; the Chemical Unloading Facility (Metropolitan Water District of southern California), Perris, Calif., is currently unused; and Agriform, Woodland, Calif. greatly overstated its vulnerable population.

** Vulnerability zone figures, submitted by facilities to EPA, indicate residential populations within range of a worst-case toxic chemical release. These figures are not forecasts of potential casualties.

*** Congressional districts identified here are located, at least in part, within the facility's vulnerability zone.

Appendix A (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional Districts
Sentry Industries, Inc.		Miami	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	2,113,410	FL 17, 18, 20, 21, 25
Allied Universal Corporation		Miami	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,840,283	FL 17, 18, 20, 21, 25
Alexander Orr Water Treatment Plant	Miami-Dade Water and Sewer Department	Miami	FL	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,643,691	FL 17, 18, 20, 21, 25
Fiveash Water Treatment Plant	City of Fort Lauderdale	Fort Lauderdale	FL	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,526,000	FL 17, 19, 20, 22, 23
City of Tampa–Howard F. Curren AWTP		Tampa	FL	Facility uses anhydrous sulfur dioxide (and chlorine gas) to treat wastewater.	Treat wastewater with ultraviolet light, or use sodium bisulfite in place of anhydrous sulfur dioxide and liquid bleach in place of chlorine gas.	1,042,000	FL 9–12
Clorox Products Manufacturing Company	The Clorox Company	Forest Park	GA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	1,077,700	GA 4, 5, 8, 13
ExxonMobil Oil Corporation Joliet Refinery	Exxon Mobil Corporation	Channahon	IL	Petroleum refinery uses hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	975,905	IL 1, 2, 11, 13, 14
Stepan Company	Stepan Company	Elwood	IL	Facility uses sulfur trioxide in manufacturing sulfonic acids that are sold or further processed into surfactants for household and industrial detergents and cleaners.	Use sulfur-burning equipment to generate sulfur trioxide on-site as needed for direct use into the process.	1,200,000	IL 1–3, 11, 13, 14
PDV Midwest Refining, LLC	CITGO Petroleum Corporation	Lemont	IL	Petroleum refinery uses hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	3,100,000	IL 1–7, 11, 13, 14
K.A. Steel Chemicals, Inc.		Lemont	IL	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	1,411,632	IL 1, 3, 4, 6, 7, 11, 13
Willow Springs Terminal	Rowell Chemical Corporation	Willow Springs	IL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	2,000,000	IL 1, 3–7, 13
Pelron		Lyons	IL	Specialty chemical manufacturing facility uses ethylene oxide in producing polyols for use in urethane products.	Produce biopolyols from soy rather than petrochemical polyols from ethylene oxide.	1,650,568	IL 1, 3–7, 13
PVS Chemical Solutions, Inc.	PVS Chemicals Incorporated	Chicago	IL	Chemical manufacturing facility produces and distributes anhydrous sulfur dioxide and other sulfur chemicals.	No single-facility alternative identified; however, point-of-use production and substitute chemicals (e.g., sodium bisulfite or metabisulfite) can replace distribution of sulfur dioxide gas.	3,300,000	IL 1–4, 7, 11, 13; IN 1
Clorox Products Manufacturing Company	The Clorox Company	Chicago	IL	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	4,013,600	IL 1–7, 9, 13
Afton Chemical Corporation	NewMarket Corporation	Sauget	IL	Chemical manufacturing facility uses chlorine gas in producing additives for lubricating oils and fuels.	Generate chlorine as needed without bulk storage or co-locate with an as-needed source of chlorine.	1,300,000	IL 12, 19; MO 1–3
Solutia W. G. Krummrich Plant	Solutia	Sauget	IL	Chemical manufacturing facility uses chlorine gas in producing intermediate chemicals used primarily to make dry stabilized chlorine water treatment products.	Generate chlorine as needed or co-locate with an as-needed source; eliminate or minimize storage.	1,200,000	IL 12, 19; MO 1–3
Vertex Chemical Corporation Dupo, IL		Dupo	IL	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	1,000,000	IL 12; MO 1–3
JCI Jones Chemicals, Inc Beech Grove, IN		Beech Grove	IN	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,450,430	IN 4–7
Kemira Water Solutions, Inc.	Kemira Water Solutions, Inc.	East Chicago	IN	Chemical manufacturing facility uses chlorine gas in producing ferrous chloride and ferric chloride for use by the water treatment industry.	Produce ferrous chloride from hydrochloric acid (<37 percent concentration) and scrap steel, oxidized with liquid hydrochloric acid and oxygen to ferric chloride.	3,250,000	IN 1; IL 1–3, 7

Appendix A (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional Districts
Dover Chemical–Hammond Works Operated by Keil	Dover Chemical Corporation	Hammond	IN	Chemical manufacturing facility uses chlorine gas in producing chlorinated paraffins for use in diverse industries.	Generate chlorine as needed without bulk storage or co-locate with an as-needed source of chlorine.	1,882,494	IN 1; IL 1--4, 7
Chalmette Refining, L.L.C.	Chalmette Refining, L.L.C (ExxonMobil)	Chalmette	LA	Petroleum refinery uses hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	1,066,418	LA 1--3
Murphy Oil USA, Inc. Meraux Refinery	Murphy Oil Corporation	Meraux	LA	Petroleum refinery uses hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	1,056,000	LA 1--3
Hawkins Point Plant	Millennium Inorganic Chemicals Inc.	Baltimore	MD	Chemical manufacturing facility uses chlorine gas in producing titanium dioxide pigments.	Produce titanium dioxide pigments using the sulfate process; also, chlorine can be generated as needed without bulk storage.	1,440,017	MD 1--3, 7
JCI Jones Chemicals, Inc Riverview Facility		Riverview	MI	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	2,774,433	MI 9, 11--15
Taminco–Riverview, MI Plant	Taminco Higher Amines, Inc.	Riverview	MI	Chemical manufacturing facility uses ethylene oxide in producing industrial chemicals, primarily alkanolamines used in diverse industries.	No alternative identified.	2,500,000	MI 9, 11--15
Detroit WWTP–Chlorination/ Dechlorination Facility	City of *Detroit*	Detroit	MI	Facility uses anhydrous sulfur dioxide (and chlorine gas) to treat wastewater.	Treat wastewater with ultraviolet light, or use sodium bisulfite in place of anhydrous sulfur dioxide and liquid bleach in place of chlorine gas.	2,100,000	MI 9, 11--15
PVS Technologies, Inc. (Detroit)	PVS Chemicals, Inc.	Detroit	MI	Chemical manufacturing facility uses chlorine gas in producing ferrous chloride and ferric chloride for use by the water treatment industry.	Produce ferrous chloride from hydrochloric acid (<37 percent concentration) and scrap steel, oxidized with liquid hydrochloric acid and oxygen to ferric chloride.	2,000,000	MI 9, 10, 12--15
MacDermid, Inc.		Ferndale	MI	Chemical manufacturing facility uses formaldehyde in making specialty chemicals.	No definitive alternative identified; however, shipping and storing formaldehyde chilled as a gel or solid until needed minimizes the consequences of a release.	1,500,000	MI 9, 10, 12--14
Marathon Petroleum Company LLC, MN Refining Div.	Marathon Petroleum Company LLC	St. Paul Park	MN	Petroleum refinery uses hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	2,200,000	MN 2--6; WI 3
St. Paul Regional Water Services–McCarron	St. Paul Regional Water Services	Maplewood	MN	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,300,000	MN 2--6
Hawkins Water Treatment Group–Red Rock	Hawkins, Inc.	St. Paul	MN	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,132,985	MN 2--6; WI 3
Midland Resources, Inc.	Kemiron	St. Louis	MO	Chemical manufacturing facility uses chlorine gas in producing ferrous chloride and ferric chloride for use by the water treatment industry.	Produce ferrous chloride from hydrochloric acid (<37 percent concentration) and scrap steel, oxidized with liquid hydrochloric acid and oxygen to ferric chloride.	1,251,079	MO 1--3; IL 12, 19
JCI, Jones Chemicals, Inc., Charlotte		Charlotte	NC	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,413,909	NC 8–10, 12; SC 5
JCI Jones Chemicals, Inc. Merrimack		Merrimack	NH	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,208,739	NH 1, 2; MA 1, 5, 6
Kuehne Chemical Co., Inc.		South Kearny	NJ	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	12,000,000	NJ 7--11, 13; NY 5, 7--16
Infineum USA L.P. Bayway Chemical Plant	Infineum USA Inc.	Linden	NJ	Chemical manufacturing facility uses chlorine gas in producing dispersant additives for engine oils and transmission fluids.	Generate chlorine as needed without bulk storage or co-locate with an as-needed source of chlorine.	4,200,000	NJ 6--11, 13; NY 8--14
DuPont Chambers Works	E.I. DuPont de Nemours and Co., Inc.	Deepwater	NJ	Major chemical manufacturing facility uses chlorine gas to make phosgene as needed in producing aramid polymers.	Generate chlorine as needed or co-locate with an as-needed source; eliminate or minimize storage.	2,000,000	NJ 1, 2; PA 1, 2, 6, 7, 16; DE 1; MD 1
Valero Refining Co.–New Jersey	Valero Energy Corporation	Paulsboro	NJ	Petroleum refinery uses hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	3,170,000	NJ 1--3; PA 1, 2, 6, 7, 13, 16; DE 1

Appendix A (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional Districts
Thorofare Plant	Solvay Solexis, Inc.	West Deptford	NJ	Plastics material and resin manufacturing facility uses concentrated hydrofluoric acid in producing vinylidene fluoride and polyvinylidene fluoride.	No alternative identified.	4,165,831	NJ 1--4; PA 1, 2, 6--8, 13, 16; DE 1
Thatcher Company of Nevada, Inc.		Henderson	NV	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	995,700	NV 1--3
Pioneer Americas LLC	Pioneer Americas LLC	Henderson	NV	Major chlor-alkali manufacturing facility produces and distributes chlorine, as well as caustic soda, hydrochloric acid, and liquid bleach.	No single-facility alternative identified; facility ships chlorine gas, but alternate processes and distributed point-of-use production remove demand for such shipments.	1,100,000	NV 1--3; AZ 2
JCI Jones Chemical Inc. Warwick,NY		Warwick	NY	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,285,145	NY 17--19, 22; PA 10; NJ 5, 8, 9, 11
Occidental Chemical Corporation–Niagara Plant	Occidental Petroleum Corporation	Niagara Falls	NY	Major chlor-alkali manufacturing facility produces and distributes chlorine, as well as caustic soda, hydrochloric acid, and liquid bleach.	No single-facility alternative identified; facility ships chlorine gas, but alternate processes and distributed point-of-use production remove demand for such shipments.	1,100,000	NY 26--28
Olin Corporation–Niagara Falls, New York Plant	Olin Corporation	Niagara Falls	NY	Major chlor-alkali manufacturing facility produces and distributes chlorine, as well as caustic soda, hydrochloric acid, and liquid bleach.	No single-facility alternative identified; facility ships chlorine gas, but alternate processes and distributed point-of-use production remove demand for such shipments.	998,200	NY 26--28
Olin Corporation, Niagara Falls, NY–Foote Yard	Olin Corporation	Niagara Falls	NY	Facility-controlled rail yard holds chlorine railcars awaiting shipment to customers.	No single-facility alternative identified; facility holds chlorine gas shipments, but alternate processes and distributed point-of-use production remove demand for such shipments.	980,000	NY 26--28
Ross Incineration Services, Inc.	Ross Consolidated Corp.	Eaton Township	OH	Hazardous waste facility receives and incinerates furan and many other chemicals; storage amounts vary at any one time.	Use administrative controls to maintain inventory below danger threshold amounts.	1,347,531	OH 5, 9--11, 13, 14, 16
JCI Jones Chemicals Inc.–Barberton, Ohio		Barberton	OH	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,286,164	OH 13, 14, 16--18
PPG Industries, Barberton	PPG Industries, Inc.	Barberton	OH	Chemical manufacturing facility uses phosgene in making chloroformate to produce plastic resin monomers used in optical lenses.	No alternative identified; however, modifying reactor may prevent phosgene from accumulating.	1,305,894	OH 13, 14, 16--18
DuPont Fort Hill Plant		North Bend	OH	Chemical manufacturing facility produces and sells oleum (fuming sulfuric acid) as a co-product of producing and regenerating sulfuric acid.	No single-facility alternative identified; facility is an oleum supplier, but many consumer industries produce or regenerate sulfur compounds on-site or use alternate chemicals.	1,329,683	OH 1, 2, 8; KY 4; IN 6, 9
Rohm & Haas Cincinnati Facility	Rohm & Haas Company	Cincinnati	OH	Chemical manufacturing facility uses chlorine gas in producing specialty intermediate chemicals used as additives in polyvinyl chloride (PVC) plastics.	Generate chlorine as needed or co-locate with an as-needed source of chlorine.	1,200,000	OH 1--3, 8; KY 4
Univar USA Inc.–Cincinnati Branch	Univar USA Inc.	Cincinnati	OH	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	966,117	OH 1--3, 8
Appleton Papers Inc., West Carrollton Mill	Appleton Papers Inc.	West Carrollton	OH	Paper mill uses chlorine gas in bleaching recycled paper pulp.	Bleach pulp with chlorine-free processes (oxygen, hydrogen peroxide, ozone) or use chlorine dioxide as needed without bulk storage.	1,200,000	OH 2, 3, 7, 8
Trainer Refinery	ConocoPhillips	Trainer	PA	Petroleum refinery uses hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	2,400,000	PA 1, 2, 6, 7, 16; DE 1; NJ 1, 2
Sunoco Philadelphia Refinery	Sunoco, Inc.	Philadelphia	PA	Petroleum refinery uses concentrated hydrofluoric acid in processing crude oil into gasoline; facility plans to convert to modified (less volatile) hydrofluoric acid.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	4,400,000	PA 1, 2, 6--8, 13, 16; DE 1; NJ 1--4
Omohundro Water Treatment Plant	Metro Water and Sewer Department	Nashville	TN	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	973,663	TN 4--7
Penn Specialty Chemicals, Inc. (Penn A Kem)	(PennAKem/Minakem Group)	Memphis	TN	Specialty chemical manufacturing facility produces furan, which it sells or uses to synthesize furan-based fine chemicals for use in diverse industries.	No alternative identified.	970,000	TN 7--9; AR 1; MS 1

Appendix A (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional Districts
DuPont Memphis Plant	E. I. DuPont de Nemours and Company	Memphis	TN	Chemical manufacturing facility uses oleum (fuming sulfuric acid) in producing potassium monopersulfate, an oxidizer used primarily in swimming pool treatment products.	Use sulfur-burning equipment to eliminate oleum railcars by producing sulfur compounds on-site as needed.	1,054,025	TN 7–9; AR 1; MS 1
NTMWD Regional Water Treatment Plant		Wylie	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	2,138,034	TX 3–5, 24, 26, 30, 32
Eastside Water Treatment Plant	Dallas Water Utilities	Sunnyvale	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,800,000	TX 3–6, 30, 32
Central Regional Wastewater System	Trinity River Authority of Texas	Grand Prairie	TX	Facility uses anhydrous sulfur dioxide (and chlorine gas) to treat wastewater.	Treat wastewater with ultraviolet light, or use sodium bisulfite in place of anhydrous sulfur dioxide and liquid bleach in place of chlorine gas.	3,931,692	TX 3, 5, 6, 12, 17, 24, 26, 30, 32
Petra Chemical Company	Petra Chemical Company	Dallas	TX	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	2,300,000	TX 3, 5, 6, 24, 26, 30, 32
Bachman Water Treatment Plant–2007	Dallas Water Utilities	Dallas	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,100,000	TX 3, 5, 24, 30, 32
Tarrant County Water Supply Project	Trinity River Authority of Texas	Euless	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,303,125	TX 6, 12, 24, 26, 30, 32
Rhodia, Houston Plant	Rhodia Inc.	Houston	TX	Chemical manufacturing facility produces and sells oleum (fuming sulfuric acid) as a co-product of producing and regenerating sulfuric acid.	No single-facility alternative identified; facility is an oleum supplier, but many consumer industries produce or regenerate sulfur compounds on-site or use alternate chemicals.	3,451,932	TX 2, 7–10, 14, 18, 22, 29
Arkema Inc.	Arkema Delaware Inc.	Houston	TX	Chemical manufacturing facility produces hydrogen sulfide and mercaptans; carbon disulfide is a byproduct shipped to off-site customers.	No single-facility alternative identified; facility is a major supplier of carbon disulfide.	2,000,000	TX 2, 7, 9, 14, 18, 22, 29
ALTIVIA Greens Bayou		Houston	TX	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	3,400,000	TX 2, 7, 9, 18, 22, 29
GB Biosciences Corporation/Greens Bayou Plant	Syngenta Crop Protection, Inc.	Houston	TX	Pesticide manufacturing facility uses chlorine gas in producing chlorothalonil agricultural fungicides.	Generate chlorine as needed or co-locate with an as-needed source; eliminate or minimize storage.	1,213,554	TX 2, 7, 9, 18, 22, 29
Stolthaven Houston Inc.	Stolt-Nielsen Transportation Group Inc.	Channelview	TX	Chemical shipping terminal stores and transfers acrylonitrile for manufacturing at other facilities into synthetic rubber, resins, and fibers.	No single-facility alternative identified; facility is a major storage terminal.	1,000,000	TX 2, 7–9, 14, 18, 22, 29
OXI Industries, Inc.	DPC Industries, Inc.	Houston	TX	Facility repackages bulk shipments of anhydrous sulfur dioxide into smaller containers.	Phase out bulk distribution of anhydrous sulfur dioxide gas; generate and/or distribute alternatives such as sodium bisulfite and metabisulfite.	1,408,353	TX 2, 7, 9, 14, 18, 22, 29
East Water Purification Plant		Houston	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	1,300,000	TX 2, 7, 9, 14, 18, 22, 29
Clorox Products Manufacturing Company	The Clorox Company	Houston	TX	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	1,868,700	TX 2, 7, 9, 18, 22, 29
Akzo Nobel Surface Chemistry LLC Houston Plant	Akzo Nobel Chemicals Inc.	Houston	TX	Specialty manufacturing facility uses ethylene oxide in making surfactants and detergents for diverse consumer and industrial applications.	No alternative identified.	1,100,000	TX 7, 9, 14, 18, 22, 29
KIK (Houston) Inc.	KIK International Inc.	Houston	TX	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas.	2,127,533	TX 7, 9, 14, 18, 22, 29
Houston Plant	Ethyl Corporation	Pasadena	TX	Chemical manufacturing facility uses chlorine gas in producing dispersant additives for oil-based lubricants.	Generate chlorine as needed without bulk storage or co-locate with an as-needed source of chlorine.	1,100,000	TX 2, 7, 9, 14, 18, 22, 29
Houston Ammonia Terminal, L.P.	Terra Mississippi Nitrogen, Inc./PCS Nitrogen	Pasadena	TX	Marine cargo terminal receives, stores, and transfers several hundred million pounds of anhydrous ammonia each year.	No single-facility alternative identified; facility is a major terminal.	2,400,000	TX 2, 7, 9, 14, 18, 22, 29

Appendix A (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional Districts
Agrifos Fertilizer Inc.		Pasadena	TX	Facility stores and uses anhydrous ammonia in producing ammonium phosphate and ammonium thiosulfate fertilizers.	No single-facility alternative identified; facility is major producer of ammonia fertilizers, but may be able to reduce ammonia storage.	3,146,219	TX 2, 7–9, 14, 18, 22, 29
Clear Lake Plant	Celanese, Ltd.	Pasadena	TX	Facility is a major producer of ethylene oxide, which is used on-site to produce ethylene glycol or sold to other manufacturers.	No alternative identified.	1,400,000	TX 2, 9, 14, 18, 22, 29
Bayer MaterialScience–Baytown	Bayer MaterialScience	Baytown	TX	Petrochemical and chlor-alkali facility produces, receives, and uses chlorine gas in manufacturing industrial chemicals and products.	Generate additional chlorine as needed or use pipeline delivery without bulk storage.	1,100,000	TX 2, 8, 9, 14, 18, 22, 29
Oxy Vinyls, LP–Deer Park VCM Plant	Occidental Petroleum Corporation	Deer Park	TX	Chemical manufacturing facility uses anhydrous hydrogen chloride in producing vinyl chloride monomer, primarily for use in polyvinyl chloride (PVC) plastics.	No immediate alternative identified; however, diverse available substitutes may replace PVC plastics.	2,600,000	TX 2, 7–9, 14, 18, 22, 29
Clean Harbors Deer Park, LP	Clean Harbors Environmental Services, Inc.	Deer Park	TX	Hazardous waste facility receives and incinerates furan and many other chemicals; storage amounts vary at any one time.	Use administrative controls to maintain inventory below danger threshold amounts.	2,400,000	TX 2, 7–9, 14, 18, 22, 29
Oxy Vinyls, LP–Battleground Chlor-Alkali Plant	Occidental Petroleum Corporation	La Porte	TX	Major alkalies and chlorine manufacturing facility produces and stores chlorine gas, primarily for use at other facilities in producing polyvinyl chloride (PVC).	No immediate alternative identified; however, diverse available substitutes may replace PVC plastics.	2,300,000	TX 2, 7–9, 14, 18, 22, 29
INVISTA Intermediates LaPorte Plant	INVISTA S.a.r.l.	LaPorte	TX	Chemical manufacturing facility uses formaldehyde solution in producing butanediol and tetrahydrofuran, intermediate chemicals used to manufacture spandex fibers and other materials.	Produce butanediol without bulk toxic inhalation hazard chemicals, or minimize potential formaldehyde release from delivery pipelines and storage.	1,889,251	TX 2, 7, 9, 14, 18, 22, 29
Oxy Vinyls, LP–La Porte VCM Plant	Occidental Petroleum Corporation	La Porte	TX	Chemical manufacturing facility uses anhydrous hydrogen chloride in producing vinyl chloride monomer, primarily for use in polyvinyl chloride (PVC) plastics.	No immediate alternative identified; however, diverse available substitutes may replace PVC plastics.	1,400,000	TX 2, 9, 14, 18, 22, 29
La Porte Plant	DuPont	La Porte	TX	Chemical manufacturing facility is a major producer of hydrofluoric acid, used in various fluorochemical product industries.	No alternative identified.	1,600,000	TX 2, 7, 9, 14, 18, 22, 29
Central Valley Water Reclamation Facility	Central Valley Water Reclamation Facility Board	Salt Lake City	UT	Facility uses chlorine gas (and anhydrous sulfur dioxide) to treat wastewater.	Treat wastewater with ultraviolet light, or use liquid bleach in place of chlorine gas, and sodium bisulfite in place of anhydrous sulfur dioxide gas.	1,334,000	UT 1–3
JCI Jones Chemicals, Inc		Tacoma	WA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	1,889,626	WA 1, 6–9

Appendix B

List of 202 additional facilities and solutions

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population*	Congressional District**
Bermco Aluminum	Berman Brothers Iron and Metal Company, Inc.	Birmingham	AL	Secondary aluminum smelter uses chlorine gas in fluxing operations to remove impurities from aluminum alloys.	Remove impurities by fluxing with solid magnesium chloride salts injected with nitrogen gas.	200,000	7
Harcros Chemcials Inc.–Muscle Shoals		Muscle Shoals	AL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	120,000	5
DPC Enterprises, L.P.		Mobile	AL	Facility repackages bulk shipments of anhydrous sulfur dioxide and chlorine gas to smaller containers, and produces liquid bleach.	Produce sulfur chemicals from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	365,719	1
Domtar Industries Inc. Ashdown Mill		Ashdown	AR	Paper mill generates chlorine dioxide for use in the pulp bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	129,750	4
23rd Avenue Wastewater Treatment Plant	City of Phoenix	Phoenix	AZ	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	176,143	4
Union Hills Water Treatment Plant	City of Phoenix, Water Services Department	Phoenix	AZ	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	131,937	3
Val Vista Water Treatment Plant	City of Phoenix, Water Services Department	Mesa	AZ	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	139,857	6
Silver Lake Chlorination Station	City of Los Angeles Department of Water and Power	Silver Lake	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	380,000	33
ExxonMobil Torrance Refinery	Exxon Mobil Corporation	Torrance	CA	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	255,524	36
San Jose Creek Water Reclamation Plant	County Sanitation Districts of Los Angeles County	Whittier	CA	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	103,660	38
Los Coyotes Water Reclamation Plant	County Sanitation Districts of Los Angeles County	Cerritos	CA	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	222,041	39
Ultramar Inc. d/b/a Valero Wilmington Refinery	Valero Energy Corporation	Wilmington	CA	Petroleum refinery uses modified (less volatile) hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	360,000	46
BP Carson Refinery	BP West Coast Products LLC	Carson	CA	Petroleum refinery uses anhydrous ammonia in among other uses power plant equipment to control nitrogen oxide emissions.	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	259,270	37
Los Angeles Aqueduct Filtration Plant	City of Los Angeles Department of Water and Power	Sylmar	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	290,000	27
Hasa Inc.–Saugus		Saugus	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	801,205	25
OLS Energy–Chino Cogeneration Facility	OLS Power, LLP	Chino	CA	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	108,084	42

* Vulnerability zone figures, submitted by facilities to EPA, indicate residential populations within range of a worst-case toxic chemical release. These figures are not forecasts of potential casualties.

** This indicates the congressional district in which the facility is located.

Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Custom Alloy Light Metals, Inc.		Industry	CA	Secondary aluminum smelter uses chlorine gas in fluxing operations to remove impurities from aluminum alloys.	Remove impurities by fluxing with solid magnesium chloride salts injected with nitrogen gas.	960,000	38
F. E. Weymouth Water Treatment Plant	Metropolitan Water District of So. California	La Verne	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	304,873	26
Alvarado Water Treatment Plant	City of San Diego Water Department	La Mesa	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	109,600	52
City of Escondido/Vista Water Treatment Plant	City of Escondido/Vista Irrigation District	Escondido	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	130,000	50
Vista Metals Corp.	Alpert and Alpert	Fontana	CA	Secondary aluminum smelter uses chlorine gas in fluxing operations to remove impurities from aluminum alloys.	Remove impurities by fluxing with solid magnesium chloride salts injected with nitrogen gas.	390,000	43
TST Inc.		Fontana	CA	Secondary aluminum smelter uses chlorine gas in fluxing operations to remove impurities from aluminum alloys.	Remove impurities by fluxing with solid magnesium chloride salts injected with nitrogen gas.	804,625	43
Henry J. Mills Water Treatment Plant	Metropolitan Water District of Southern California	Riverside	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	115,600	44
Moreno Valley Regional Water Reclamation Facility	Eastern Municipal Water District	Moreno Valley	CA	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	323,700	45
Perris Valley Regional Water Reclamation Facility	Eastern Municipal Water District	Perris	CA	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	208,356	49
San Jacinto Valley RWRF	Eastern Municipal Water District	San Jacinto	CA	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	106,937	41
Michelson Water Reclamation Plant	Irvine Ranch Water District	Irvine	CA	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	685,097	48
Snowden Enterprises–Fresno	Snowden Enterprises, Inc.	Fresno	CA	Facility repackages bulk shipments of anhydrous sulfur dioxide into smaller containers.	Phase out bulk distribution of anhydrous sulfur dioxide gas by generating sulfur compounds on-site for distribution as sodium bisulfite, metabisulfite, and other alternatives.	660,000	20
Palo Alto Regional Water Quality Control Plant		Palo Alto	CA	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	191,998	14
Clorox Products Manufacturing Company	The Clorox Company	Fairfield	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	233,400	10
Cement Hill Water Treatment Plant	Suisun-Solano Water Authority	Fairfield	CA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	207,775	10
Hasa Inc.–Pittsburg		Pittsburg	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	488,269	7
Calpine Pittsburg		Pittsburg	CA	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	120,000	7
San Jose/Santa Clara Water Pollution Control Plant	City of San Jose	San Jose	CA	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	245,000	15
Sierra Chemical Co., Stockton Facility		Stockton	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	364,261	18
City of Stockton Tertiary Treatment Plant	City of Stockton, Municipal Utilities Department	Stockton	CA	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	430,200	18
Stockton CoGen Company, Inc.	Air Products and Chemicals, Inc.	Stockton	CA	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	151,795	18

Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Pioneer Americas LLC dba Olin Chlor Alkali Product	Pioneer Companies, Inc.	Tracy	CA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	888,435	11
Snowden Enterprises–Modesto	Snowden Enterprises, Inc.	Modesto	CA	Facility repackages bulk shipments of anhydrous sulfur dioxide into smaller containers.	Phase out bulk distribution of anhydrous sulfur dioxide gas by generating sulfur compounds on-site for distribution as sodium bisulfite, metabisulfite, and other alternatives.	460,000	18
Secondary Wastewater Treatment Plant	City of Modesto	Modesto	CA	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	450,780	18
Dry Creek Regional Wastewater Treatment Plant	City of Roseville, Roseville, California	Roseville	CA	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	626,000	4
Carson Energy Cogeneration Plant		Sacramento	CA	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	134,625	5
Metro Wastewater Reclamation District		Denver	CO	Facility is converting from anhydrous sulfur dioxide and chlorine gas used to treat wastewater.	Complete conversion from anhydrous sulfur dioxide to sodium bisulfite, and from chlorine gas to liquid bleach; a potential long-term alternative is ultraviolet light.	925,000	7
H. Krevit & Co., Inc.		New Haven	CT	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	290,000	3
McMillan Water Treatment Plant	Washington Aqueduct/US Army Corps of Engineers	Washington	DC	Facility uses chlorine gas to treat drinking water	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate	98,000	1
Kuehne Chemical Co., Inc.–Delaware City	Kuehne Chemical Co., Inc.	Delaware City	DE	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	480,000	1
Dupont–Edge Moor, DE Facility	E.I. duPont DeNemours & Company	Edge Moor	DE	Chemical manufacturing facility uses chlorine gas in producing titanium dioxide pigments.	Produce titanium dioxide pigments using the sulfate process; also, chlorine can be generated as needed without bulk storage.	158,717	1
Georgia-Pacific Corporation, Palatka Operations	Georgia-Pacific Corporation	Palatka	FL	Pulp and paper mill generates chlorine dioxide for use in the bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	148,315	3
Smurfit-Stone Container Corp., Panama City Mill	Smurfit-Stone Container Corp. Enterprises, Inc.	Panama City	FL	Pulp mill generates chlorine dioxide for use in the bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	133,607	2
Brenntag Mid-South, Inc.	Brenntag U.S.A.	Orlando	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	867,151	8
Harris Field Water Treatment Plant		Homestead	FL	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	106,708	25
Wittkop Park Water Treatment Plant		Homestead	FL	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	106,459	25
Clorox Products Manufacturing Company	The Clorox Company	Tampa	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	633,600	11
Hillsborough River Water treatment Plant-Tampa, FL		Tampa	FL	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	508,760	11
Chemical Formulators Inc.		Tampa	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	931,820	11
Harcros Chemicals Inc.–Tampa		Tampa	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	780,000	11

Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
DPC Enterprises, L.P.		Tampa	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	754,116	11
Bayside Power Station	Tampa Electric Company/ TECO Energy Company	Tampa	FL	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	218,375	11
Brenntag Mid-South, Inc.	Brenntag U.S.A.	Clearwater	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	830,000	10
McIntosh Power Plant/ Northside WWTP	City of Lakeland	Lakeland	FL	Power plant uses anhydrous ammonia in equipment to control emissions; adjacent wastewater plant uses chlorine gas to disinfect wastewater.	Control power plant emissions with aqueous ammonia or urea; treat wastewater with liquid bleach or ultraviolet light.	131,000	12
KIK (Florida) Inc.	KIK International Inc.	Auburndale	FL	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	354,389	12
Allied Universal Corporation		Ft. Pierce	FL	Facility repackages anhydrous sulfur dioxide and produces sodium bisulfite, and repackages chlorine gas and produces liquid bleach.	Produce sodium bisulfite from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	160,030	23
KIK (Georgia) Inc.	KIK Custom Products	Hampton	GA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	369,619	8
Tronox Pigments (Savannah) Inc.	Tronox LLC	Savannah	GA	Chemical manufacturing facility uses chlorine gas in producing titanium dioxide pigments.	Produce titanium dioxide pigments using the sulfate process; also, chlorine can be generated as needed without bulk storage.	230,000	12
Hydrite Chemical Co.– Waterloo	Hydrite Chemical Co.	Waterloo	IA	Chemical manufacturing facility burns elemental sulfur to produce anhydrous sulfur dioxide, for distribution or processing into bisulfites or other sulfur chemicals.	Phase out bulk distribution of anhydrous sulfur dioxide gas; distribute alternatives such as sodium bisulfite and metabisulfite.	153,000	1
Penford Products Co.	Penford Corporation	Cedar Rapids	IA	Wet corn milling facility uses anhydrous sulfur dioxide as a processing aid and to inhibit bacteria during corn steeping.	Process corn using sodium bisulfite or metabisulfite, or generate sulfur dioxide on-site for use as needed without bulk storage.	216,264	2
ADM Corn Processing– Cedar Rapids	Archer Daniels Midland Company	Cedar Rapids	IA	Wet corn milling facility uses anhydrous sulfur dioxide as a processing aid and to inhibit bacteria during corn steeping.	Process corn using sodium bisulfite or metabisulfite, or generate sulfur dioxide on-site for use as needed without bulk storage.	130,000	2
Rock Island Water Plant	City of Rock Island	Rock Island	IL	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	153,618	17
Rock Island Wastewater Treatment Plant	City of Rock Island, Illinois	Rock Island	IL	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	145,000	17
Ameren Edwards		Bartonville	IL	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	120,000	18
CWLP's Dallman Power Station	City of Springfield	Springfield	IL	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	110,000	19
GAC MidAmerica, Inc (General Chemical/ Gentek)	GAC MidAmerica, Inc.	Indianapolis	IN	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	895,348	7
Alexander Chemical Corporation		Kingsbury	IN	Facility repackages bulk chlorine gas and produces liquid bleach, and repackages bulk anhydrous sulfur dioxide and produces sodium bisulfite.	Produce liquid bleach from salt and electricity and sodium bisulfite from sulfur-burning equipment; phase out distribution of chlorine gas and anhydrous sulfur dioxide gas.	379,260	2
OnLine Packaging, Incorporated– Michigan City		Michigan City	IN	Facility uses bulk shipments of chlorine gas in producing liquid bleach and windshield washer solution.	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	233,800	2
Alcoa Inc.– Warrick Operations	Alcoa Inc.	Newburgh	IN	Aluminum smelting facility uses chlorine gas to remove impurities during re-smelting operations in producing aluminum alloys.	Remove impurities by fluxing with solid magnesium chloride salts injected with nitrogen gas.	385,217	8

Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Brenntag Mid-South, Inc.	Brenntag U.S.A.	Terre Haute	IN	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	116,180	8
A.E. Staley Manufacturing Company--Lafayette South	A.E. Staley Manufacturing Company	Lafayette	IN	Wet corn milling facility uses anhydrous sulfur dioxide as a processing aid and to inhibit bacteria during corn steeping.	Process corn using sodium bisulfite or metabisulfite, or generate sulfur dioxide on-site for use as needed without bulk storage.	160,000	4
A.E.Staley Manufacturing Company–Sagamore	A.E.Staley Manufacturing	Lafayette	IN	Wet corn milling facility uses anhydrous sulfur dioxide as a processing aid and to inhibit bacteria during corn steeping.	Process corn using sodium bisulfite or metabisulfite, or generate sulfur dioxide on-site for use as needed without bulk storage.	105,000	4
Topeka Water Treatment Plant	City of Topeka, Kansas	Topeka	KS	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	173,925	2
Water Treatment Plant	City of Wichita,Kansas	Wichita	KS	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	130,000	4
Forth Technologies, Inc.		Louisville	KY	Custom chemical processing and toll manufacturing facility uses bulk shipments of oleum (fuming sulfuric acid) in producing specialty perylene chemicals.	Produce sulfur chemicals on-site as needed from sulfur-burning equipment.	161,714	3
Crescent Hill Water Treatment Plant	Louisville Water Company	Louisville	KY	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	675,100	3
Kentucky American Water Co Richmond Rd Station	American Water Works Service Company, Inc.	Lexington	KY	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	105,797	6
Catlettsburg Refining, LLC	Marathon Petroleum Company, LLC	Catlettsburg	KY	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	300,000	4
Brenntag Mid-South, Inc.	Brenntag U.S.A.	Henderson	KY	Facility repackages bulk chlorine gas and produces liquid bleach, and repackages bulk anhydrous sulfur dioxide and produces sodium bisulfite.	Produce liquid bleach from salt and electricity and sodium bisulfite from sulfur-burning equipment; phase out distribution of chlorine gas and anhydrous sulfur dioxide gas.	239,151	1
ConocoPhillips Company Alliance Refinery	ConocoPhillips Company	Belle Chasse	LA	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	845,059	3
Marathon Petroleum Company LLC LARefiningDivision	Marathon Petroleum Company LLC	Garyville	LA	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	378,730	3
East Bank Wastewater Treatment Plant	Sewerage & Water Board of New Orleans	New Orleans	LA	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	726,185	2
Carrollton Water Purification Plant	Sewerage and Water Board of New Orleans	New Orleans	LA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	892,320	2
Louisiana Pigment Company, L.P.	KRONOS Louisiana, Inc./ Tioxide Americas, Inc.	Westlake	LA	Pigment manufacturing facility uses titanium tetrachloride in producing titanium dioxide.	Produce titanium dioxide pigments using the sulfate process.	160,000	7
Placid Refining Co. L.L.C.–Port Allen Refinery		Port Allen	LA	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	330,000	6
Harcros Chemicals Inc.–St. Gabriel	Harcros Chemicals Inc.	St. Gabriel	LA	Facility repackages bulk anhydrous sulfur dioxide and produces sodium bisulfite, and repackages bulk chlorine gas and produces liquid bleach.	Produce sodium bisulfite from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	380,000	6
Port Hudson Operations	Georgia-Pacific Consumer Operations LLC	Zachary	LA	Pulp and paper mill generates chlorine dioxide for use in the bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	520,000	6
Central Wastewater Treatment Plant	City of Baton Rouge–East Baton Rouge Parish	Baton Rouge	LA	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	136,223	6
Clorox Products Manufacturing Company	The Clorox Company	Aberdeen	MD	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	229,400	2

Appendix B (continued)

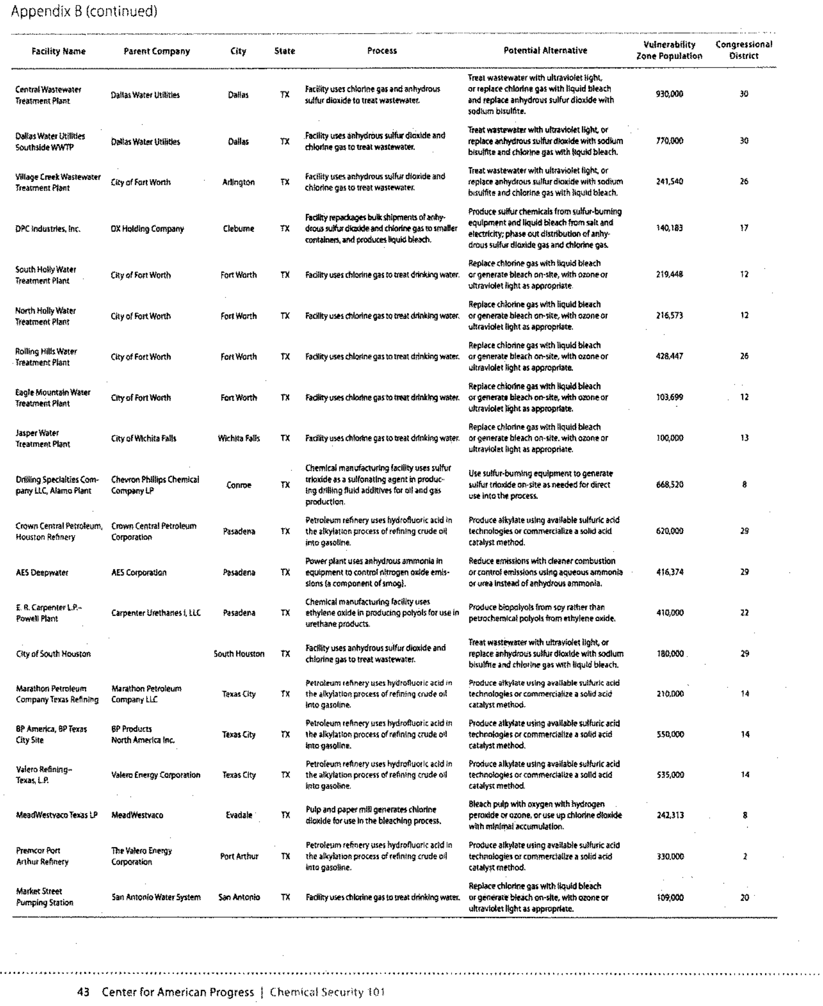
Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Ashburton Chlorinator Station	City of Baltimore–Department of Public Works	Baltimore	MD	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	101,800	7
Druid Lake Effluent Chlorinator Station	City of Baltimore–Department of Public Works	Baltimore	MD	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	130,000	7
Druid Lake Influent Chlorinator Station	City of Baltimore–Department of Public Works	Baltimore	MD	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	120,000	7
Montebello Filtration Plant Chlorinator Station	City of Baltimore–Department of Public Works	Baltimore	MD	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	108,000	7
GAC Chemical–New England	GAC Chemical Corporation	Searsport	ME	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	144,671	2
High-Po-Chlor, Inc.		Romulus	MI	Facility uses bulk shipments of chlorine gas in producing liquid bleach.	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	135,000	15
BASF Corporation–Wyandotte Site	BASF Corporation	Wyandotte	MI	Chemical manufacturing facility uses ethylene oxide in producing polyols for use in urethane products.	Produce biopolyols from soy rather than petrochemical polyols from ethylene oxide.	105,000	13
DPC Industries, Inc.	DX Holding Company	Rosemount	MN	Facility repackages bulk shipments of anhydrous sulfur dioxide and chlorine gas to smaller containers, and produces liquid bleach.	Produce sulfur chemicals from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	918,762	2
Covanta Hennepin Energy Resource Company, L.P.	Covanta Hennepin Energy Resource Company, L.P.	Minneapolis	MN	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	182,538	5
Fridley Filter Plant	Minneapolis Water Works	Minneapolis	MN	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	337,000	5
American Crystal Sugar Company-Moorhead	American Crystal Sugar Company	Moorhead	MN	Sugar manufacturing facility uses anhydrous sulfur dioxide in producing crystal sugar from sugar beets.	Generate sulfur dioxide on-site with a sulfur burner for use as needed without bulk storage.	130,000	7
Kansas City, Missouri Water Treatment Plant		Kansas City	MO	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	720,000	6
Brenntag Mid-South, Inc.	Brenntag, Inc.	Kansas City	MO	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	643,000	5
KCPL–Hawthorn Generating Facility	Kansas City Power & Light/ Great Plains Energy	Kansas City	MO	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	160,000	5
Leaf River Cellulose, LLC	Koch Cellulose, LLC	New Augusta	MS	Pulp mill generates chlorine dioxide for use in the bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	103,010	4
DuPont DeLisle Plant	E.I. du Pont de Nemours & Co., Inc.	Pass Christian	MS	Chemical manufacturing facility uses titanium tetrachloride and chlorine gas in producing titanium dioxide.	Produce titanium dioxide pigments using the sulfate process; also, chlorine can be generated as needed without bulk storage.	250,000	4
ConocoPhillips Billings Refinery	ConocoPhillips Company	Billings	MT	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	116,704	1
Blue Ridge Paper Products, Inc.	Blue Ridge Holding Corporation	Canton	NC	Pulp and paper mill generates chlorine dioxide for use in the bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	260,363	11
Florence Water Treatment Plant	Metropolitan Utilities District	Omaha	NE	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	390,000	2
DPC Industries, Inc.	DX Holding Company	Omaha	NE	Facility repackages bulk shipments of anhydrous sulfur dioxide and chlorine gas to smaller containers, and produces liquid bleach.	Produce sulfur chemicals from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	661,982	2

Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Bayonne Plant Holding L.L.C.		Bayonne	NJ	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	112,728	13
Southside Water Reclamation Plant	Albuquerque Bernalillo County Water Utility Author	Albuquerque	NM	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	120,000	1
DPC Industries, Inc	DX Holding Company	Albuquerque	NM	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	548,334	1
Sierra Chemical Co., Sparks Facility		Sparks	NV	Facility repackages anhydrous sulfur dioxide and produces sodium bisulfite, and repackages chlorine gas and produces liquid bleach.	Produce sodium bisulfite from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	246,826	2
Surpass Chemical Company, Inc. Bridge Street Plant		Albany	NY	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	517,748	21
Finch Paper, LLC	Finch Paper Holdings LLC	Glens Falls	NY	Pulp and paper mill uses anhydrous sulfur dioxide in the pulping process digester, ordinarily generated on-site without storage but occasionally supplemented with truck or rail deliveries.	Improve reliability of on-site generation of anhydrous sulfur dioxide to eliminate truck or rail deliveries.	130,000	20
City of Buffalo Water Facility		Buffalo	NY	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	514,360	27
JCI Jones Chemicals Inc.-- Caledonia		Caledonia	NY	Facility repackages bulk shipments of chlorine gas and anhydrous sulfur dioxide to smaller containers, and produces liquid bleach.	Produce liquid bleach from salt and electricity without storing chlorine gas; phase out distribution of chlorine gas and anhydrous sulfur dioxide gas.	878,368	26
Ashtabula Complex Plant 2	Millennium Inorganic Chemicals Inc.	Ashtabula	OH	Chemical manufacturing facility uses chlorine gas in producing titanium dioxide pigments.	Produce titanium dioxide pigments using the sulfate process; also, chlorine can be generated as needed without bulk storage.	102,000	14
Ashtabula Complex Plant 1	Millennium Inorganic Chemicals, Inc.	Ashtabula	OH	Chemical manufacturing facility uses chlorine gas in producing titanium dioxide pigments.	Produce titanium dioxide pigments using the sulfate process; also, chlorine can be generated as needed without bulk storage.	102,000	14
Ohio Refining Division MPC	Marathon Petroleum Company LLC	Canton	OH	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	940,000	16
Pilot Chemical Company of Ohio Lockland Plant	Pilot Chemical Company of California	Lockland	OH	Specialty chemical manufacturing facility uses sulfur trioxide in producing synthetic detergents, surfactants, emulsifiers, and sulfonic acids.	Use sulfur-burning equipment to generate sulfur trioxide on-site as needed for direct use into the process.	110,000	1
City of Del City Water Treatment Plant		Del City	OK	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	180,088	5
Brenntag Southwest, Inc. Port of Catoosa	Brenntag, Inc.	Catoosa	OK	Facility repackages bulk shipments of anhydrous sulfur dioxide and chlorine gas to smaller containers, and produces liquid bleach.	Produce sulfur chemicals from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	385,000	2
Solvay Fluorides-- Catoosa Plant	Solvay Fluorides, L.L.C.	Catoosa	OK	Facility stores concentrated hydrofluoric acid (70 percent) in producing brazing flux, sold for industrial brazing such as aluminum heat exchangers.	Transport and store less concentrated hydrofluoric acid for use as dilute acid solutions in the manufacturing process.	348,699	2
Mohawk Water Treatment Plant	City of Tulsa	Tulsa	OK	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	308,829	1
A.B. Jewell Water Treatment Plant	City of Tulsa	Tulsa	OK	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	245,622	1
Univar USA Inc., Bunola Branch 4-05	Univar USA Inc.	Bunola	PA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	645,107	12
W.P.J.W.A. Treatment Plant	Wilkinsburg-Penn Joint Water Authority	Verona	PA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	100,200	14

Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
W.P.J.W.A. Nadine Road Pump Station	Wilkinsburg-Penn Joint Water Authority	Verona	PA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	100,000	14
James Austin Company		Mars	PA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	240,000	4
Univar USA Inc., Middletown Branch	Univar USA Inc.	Middletown	PA	Facility repackages bulk shipments of anhydrous sulfur dioxide and chlorine gas to smaller containers, and produces liquid bleach.	Produce sulfur chemicals from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	558,778	17
Bristol Borough Wastewater Treatment Plant		Bristol	PA	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	145,000	8
Bristol Township Wastewater Treatment Plant		Croydon	PA	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	174,000	8
Univar USA Inc., Providence Branch	Univar USA Inc.	Providence	RI	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	955,427	2
KapStone Charleston Kraft LLC	KapStone Kraft Paper Corporation	North Charleston	SC	Paper mill uses chlorine gas to treat incoming process water.	Treat process water with liquid bleach instead of chlorine gas.	400,829	6
Bowater Incorporated	Abitibibowater Inc.	Catawba	SC	Pulp mill generates chlorine dioxide for use in the bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	157,780	5
Dry Creek Wastewater Treatment Plant	Metro Water and Sewer Department	Madison	TN	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	103,610	5
Central Wastewater Treatment Plant	Metro Water and Sewer Department	Nashville	TN	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	965,468	5
K. R. Harrington Water Treatment Plant	Metro Water and Sewer Department	Nashville	TN	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	151,736	5
Whites Creek Wastewater Treatment Plant	Metro Water and Sewer Department	Nashville	TN	Facility uses chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach.	133,753	5
DPC Enterprises, L.P.		Chattanooga	TN	Facility repackages bulk shipments of anhydrous sulfur dioxide and chlorine gas to smaller containers, and produces liquid bleach.	Produce sulfur chemicals from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	386,098	3
Brenntag Mid-South, Inc.	Brenntag U.S.A.	Chattanooga	TN	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	328,026	3
Jarden Zinc Products, Inc.	Jarden Corporation	Greeneville	TN	Manufacturer of zinc-based metal products uses chlorine to treat industrial wastewater.	Replace chlorine gas with liquid bleach.	270,000	1
Buckeye Technologies Inc.–Memphis Plant	Buckeye Technologies Inc.	Memphis	TN	Pulp mill uses chlorine gas to make bleach for brightening specialty cellulose from cotton fibers.	Brighten pulp using liquid bleach without transporting or storing chlorine gas, or use chlorine free alternatives.	639,180	9
The Premcor Refining Group Inc., a Valero Company	Valero Energy Corporation	Memphis	TN	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	791,888	9
Vertex Chemical Corporation Memphis, TN		Memphis	TN	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	560,000	9
Elm Fork Water Treatment Plant	Dallas Water Utilities	Carrollton	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	790,000	24
Ten Mile Creek Regional Wastewater System	Trinity River Authority of Texas	Ferris	TX	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	359,371	30
Forney Pump Station	Dallas Water Utilities	Sunnyvale	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	580,000	5



Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Central Wastewater Treatment Plant	Dallas Water Utilities	Dallas	TX	Facility uses chlorine gas and anhydrous sulfur dioxide to treat wastewater.	Treat wastewater with ultraviolet light, or replace chlorine gas with liquid bleach and replace anhydrous sulfur dioxide with sodium bisulfite.	930,000	30
Dallas Water Utilities Southside WWTP	Dallas Water Utilities	Dallas	TX	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	770,000	30
Village Creek Wastewater Treatment Plant	City of Fort Worth	Arlington	TX	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	241,540	26
DPC Industries, Inc.	DX Holding Company	Cleburne	TX	Facility repackages bulk shipments of anhydrous sulfur dioxide and chlorine gas to smaller containers, and produces liquid bleach.	Produce sulfur chemicals from sulfur-burning equipment and liquid bleach from salt and electricity; phase out distribution of anhydrous sulfur dioxide gas and chlorine gas.	140,183	17
South Holly Water Treatment Plant	City of Fort Worth	Fort Worth	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	219,448	12
North Holly Water Treatment Plant	City of Fort Worth	Fort Worth	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	216,573	12
Rolling Hills Water Treatment Plant	City of Fort Worth	Fort Worth	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	428,447	26
Eagle Mountain Water Treatment Plant	City of Fort Worth	Fort Worth	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	103,699	12
Jasper Water Treatment Plant	City of Wichita Falls	Wichita Falls	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	100,000	13
Drilling Specialties Company LLC, Alamo Plant	Chevron Phillips Chemical Company LP	Conroe	TX	Chemical manufacturing facility uses sulfur trioxide as a sulfonating agent in producing drilling fluid additives for oil and gas production.	Use sulfur-burning equipment to generate sulfur trioxide on-site as needed for direct use into the process.	668,520	8
Crown Central Petroleum, Houston Refinery	Crown Central Petroleum Corporation	Pasadena	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	620,000	29
AES Deepwater	AES Corporation	Pasadena	TX	Power plant uses anhydrous ammonia in equipment to control nitrogen oxide emissions (a component of smog).	Reduce emissions with cleaner combustion or control emissions using aqueous ammonia or urea instead of anhydrous ammonia.	416,374	29
E. R. Carpenter L.P.–Powell Plant	Carpenter Urethanes I, LLC	Pasadena	TX	Chemical manufacturing facility uses ethylene oxide in producing polyols for use in urethane products.	Produce biopolyols from soy rather than petrochemical polyols from ethylene oxide.	410,000	22
City of South Houston		South Houston	TX	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	180,000	29
Marathon Petroleum Company Texas Refining	Marathon Petroleum Company LLC	Texas City	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	210,000	14
BP America, BP Texas City Site	BP Products North America Inc.	Texas City	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	550,000	14
Valero Refining–Texas, L.P.	Valero Energy Corporation	Texas City	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	535,000	14
MeadWestvaco Texas LP	MeadWestvaco	Evadale	TX	Pulp and paper mill generates chlorine dioxide for use in the bleaching process.	Bleach pulp with oxygen with hydrogen peroxide or ozone, or use up chlorine dioxide with minimal accumulation.	242,313	8
Premcor Port Arthur Refinery	The Valero Energy Corporation	Port Arthur	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	330,000	2
Market Street Pumping Station	San Antonio Water System	San Antonio	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	109,000	20

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Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Mission Pumping Station	San Antonio Water System	San Antonio	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	115,000	20
34th Street Pumping Station	San Antonio Water System	San Antonio	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	122,000	20
CITGO Corpus Christi Refinery East Plant	CITGO Refining and Chemicals L.P.	Corpus Christi	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	315,420	27
Valero Refining Co.–Texas, L.P.–West Plant	Valero Energy Corporation	Corpus Christi	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	340,000	27
Flint Hills Resources, LP–CC West Refinery	Koch Industries, Inc.	Corpus Christi	TX	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	350,000	27
O.N. Stevens Water Treatment Plant	City of Corpus Christi	Corpus Christi	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	360,000	27
South Texas Chlorine, Inc.		Harlingen	TX	Facility repackages bulk shipments of chlorine gas into smaller containers.	Convert chlorine distribution to liquid bleach.	150,000	15
Lubbock Water Treatment Plant	City of Lubbock, TX	Lubbock	TX	Facility uses anhydrous ammonia (and chlorine gas) to treat drinking water.	Use aqueous ammonia in place of anhydrous ammonia; replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	113,019	19
Grimes Treatment Plant	City of Abilene	Abilene	TX	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	100,000	19
Woods Cross Refinery	Holly Refining & Marketing Company	Woods Cross	UT	Petroleum refinery uses modified (less volatile) hydrofluoric acid in the alkylation process of turning crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	216,294	1
Thatcher Company		Salt Lake City	UT	Facility repackages bulk chlorine gas and produces liquid bleach, and repackages bulk anhydrous sulfur dioxide and produces sodium bisulfite.	Produce liquid bleach from salt and electricity and sodium bisulfite from sulfur-burning equipment; phase out distribution of chlorine gas and anhydrous sulfur dioxide gas.	888,815	1
ChevronTexaco Salt Lake Refinery	ChevronTexaco Corporation	Salt Lake City	UT	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	680,000	1
JCI Jones Chemicals Inc.–Milford		Milford	VA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	272,741	1
City of Richmond Water Purification Plant	City of Richmond	Richmond	VA	Facility uses chlorine gas to treat drinking water.	Replace chlorine gas with liquid bleach or generate bleach on-site, with ozone or ultraviolet light as appropriate.	704,630	7
City of Richmond Wastewater Treatment Plant	City of Richmond	Richmond	VA	Facility uses anhydrous sulfur dioxide and chlorine gas to treat wastewater.	Treat wastewater with ultraviolet light, or replace anhydrous sulfur dioxide with sodium bisulfite and chlorine gas with liquid bleach.	722,769	3
Univar USA Inc	Univar USA Inc	Suffolk	VA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	475,000	4
KIK (Virginia) Inc.	KIK International Inc.	Salem	VA	Facility uses bulk shipments of chlorine gas in producing liquid bleach (sodium hypochlorite).	Produce bleach on-site from salt and electricity without bulk shipping or storage of chlorine gas.	227,000	6
Kimberly-Clark Everett Mill	Kimberly-Clark Worldwide	Everett	WA	Pulp mill produces and stores sulfur dioxide gas for use in ammonium bisulfite batch digesters in the pulp making process.	Extend use of sulfur burner to avoid truck delivery and minimize storage of anhydrous sulfur dioxide.	244,406	2
ConocoPhillips Company	ConocoPhillips Company	Ferndale	WA	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	120,000	2
Pioneer Americas LLC Tacoma Bleach Plant	Pioneer Companies, Inc.	Tacoma	WA	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	917,716	9

Appendix B (continued)

Facility Name	Parent Company	City	State	Process	Potential Alternative	Vulnerability Zone Population	Congressional District
Olympic Chemical Corporation	Univar USA Inc.	Tacoma	WA	Facility uses bulk shipments of anhydrous sulfur dioxide in producing sodium bisulfite.	Use sulfur-burning equipment to produce sodium bisulfite without storing sulfur dioxide gas.	900,000	9
Georgia-Pacific Consumer Products (Camas) LLC	Georgia-Pacific Consumer Products Holdings LLC	Camas	WA	Pulp and paper mill uses chlorine dioxide, as well as oxygen and hydrogen peroxide, in bleaching processes.	Bleach pulp fully with oxygen with hydrogen peroxide or ozone.	400,000	3
Chemtrade Performance Chemicals Kalama Plant	Chemtrade Logistics	Kalama	WA	Facility uses anhydrous sulfur dioxide in producing sodium hydrosulfite.	Use sulfur-burning equipment to produce sodium hydrosulfite without storing sulfur dioxide gas.	148,000	3
Murphy Oil USA Superior Refinery	Murphy Oil USA, Inc.	Superior	WI	Petroleum refinery uses hydrofluoric acid in the alkylation process of refining crude oil into gasoline.	Produce alkylate using available sulfuric acid technologies or commercialize a solid acid catalyst method.	180,000	7
Hydrite Chemical Co.–Oshkosh	Hydrite Chemical Co.	Oshkosh	WI	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	277,863	6
Brenntag Mid-South, Inc.	Brenntag U.S.A.	Nitro	WV	Facility uses bulk shipments of anhydrous sulfur dioxide in producing sodium bisulfite for distribution.	Use sulfur-burning equipment to produce sodium bisulfite without storing sulfur dioxide gas.	224,198	2
Brenntag Mid-South, Inc.	Brenntag U.S.A.	St. Albans	WV	Facility uses bulk shipments of chlorine gas in producing liquid bleach and repackaging to smaller containers.	Produce bleach on-site from salt and electricity without shipping or storing chlorine gas; phase out distribution of chlorine gas.	259,148	2

Appendix C
Methodology

This report investigates whether reasonably available alternatives could remove the possibility of a worst-case chemical release at the nation's highest-hazard chemical facilities. To determine the highest-hazard facilities, we examined Risk Management Plans, or RMPs, submitted to the EPA as of Oct. 28, 2008, and identified the facilities that report the largest surrounding vulnerable populations. We gathered this information over many months through regular visits to federal reading rooms.

"Vulnerability zone" data are presented for each facility listed in Appendices A and B. These numbers are facility-generated estimates of the residential population within range of a worst-case toxic gas release. They are not forecasts of casualties. The names of facilities listed in the appendices appear as they do in RMP reports. For some facilities, additional information is provided in brackets for identification purposes.

The vulnerability zones of some facilities overlap. In determining the total number of Americans living within range of a worst-case toxic gas release, we did not "double count" people by simply adding up all vulnerability zone data. Rather, we counted only once the population of any census block that falls within the vulnerability zone of more than one facility. That gave us the number of 80 million Americans threatened by the top 101.

The facilities listed in this report are presumed to have up-to-date RMP registrations. The RMP program requires covered facilities that no longer hold threshold amounts of certain extremely hazardous substances to notify EPA by submitting a "deregistration." Facilities do not always deregister as required. Yet the number of high-hazard RMP facilities in this report matches the number in a recent Congressional Research Service analysis of RMP facilities.[50] This report excludes facilities that deregistered after the CRS analysis, but might not include all subsequent new registrations by high-hazard RMP facilities.

To determine how facilities use and transport extremely hazardous substances we consulted company websites, trade association publications, news reports, RMPs, Securities and Exchange Commission filings, patent information, facility permits, community advisory panels, and other public sources. In some cases we contacted facilities by phone. In a few cases we inferred the means of transportation from the nature of the facility.

Information on possible alternative chemicals and processes came primarily from interviews. The author interviewed personnel at facilities that operate without large vulnerability zones; vendors of less hazardous technologies; and individuals with professional, workplace, or academic knowledge and interest in safer and more secure technologies.The following reports by public interest organizations helped by documenting safer and more secure alternatives across diverse industries:

- "Preventing Toxic Terrorism: How Some Chemical Facilities are Removing Danger to American Communities," Center for American Progress, 2006
- "Toxic Trains and the Terrorist Threat: How Water Utilities Can Get Chlorine Gas Off the Rails and Out of American Communities," Center for American Progress, 2007
- "Eliminating Hometown Hazards: Cutting Chemical Risks at Wastewater Treatment Facilities," Environmental Defense, 2003
- "Needless Risk: Oil Refineries and Hazard Reduction," U.S. Public Interest Research Group Education Fund, 2005
- "Pulp Fiction: Chemical Hazard Reduction at Pulp and Paper Mills," U.S. Public Interest Research Group Education Fund, 2007
- "Unnecessary Dangers: Emergency Chemical Release Hazards at Power Plants," Working Group on Community Right-to-Know, 2004

Appendix D

Dangers of selected extremely hazardous substances

ACRYLONITRILE

Acrylonitrile is a flammable and reactive liquid, clear or slightly yellowish in color, with a faint odor. It is used to make synthetic fibers and polymers. Acute exposure irritates the eyes, nose, throat and lungs. High exposure levels can cause weakness, headache, confusion, nausea, vomiting, and collapse. At the highest exposure levels fluid buildup in the lungs (pulmonary edema) may lead to death. Chronic exposure may interfere with the thyroid gland. Acrylonitrile is a probable human carcinogen.

AMMONIA (ANHYDROUS)

Anhydrous ammonia is a corrosive colorless gas with a strong odor. It is used primarily in fertilizers, but also in chemical intermediates and refrigeration. Acute ammonia exposure can irritate the skin; burn the eyes, causing temporary or permanent blindness; and cause headaches, nausea, and vomiting. High levels can cause fluid in the respiratory system (pulmonary or laryngeal edema), which may lead to death. Chronic exposure damages the lungs; repeated exposure can lead to bronchitis with coughing or shortness of breath.

BROMINE

Bromine is a dark, reddish-brown fuming liquid or vapor. It is used in fire retardants, drilling fluids, dyes, photographic chemicals, water treatment, fumigants, and pharmaceuticals. Vapors are highly corrosive and toxic. Contact can severely burn the skin and eyes. Inhaling bromine can irritate and damage the nose, throat, and lungs leading to headache, coughing, and nosebleed; higher levels can lead to fluid buildup in the lungs (pulmonary edema) and death.

CARBON DISULFIDE

Carbon disulfide is a flammable colorless or faintly yellow liquid with a strong, disagreeable odor. It is used in manufacturing viscose rayon, cellophane, carbon tetrachloride, and flotation agents. Acute exposure can severely irritate the eyes, skin, and nose, and can cause headaches, nausea, dizziness, unconsciousness, and death. Chronic exposure can damage a developing fetus, and may cause spontaneous abortions in women and sperm abnormalities in men. Repeat exposures can also damage the nervous system with symptoms that may include tingling, weakness, and severe mood, personality, and mental changes that can last for months or years.

CHLORINE

Chlorine is a greenish-yellow gas with a strong, irritating odor. It is used in making other chemicals, as a disinfectant, in bleaching, and for purifying water and sewage. Acute exposure can severely burn the eyes and skin, causing permanent damage, and may cause throat irritation, tearing, coughing, nose bleeds, chest pain, fluid buildup in the lungs (pulmonary edema), and death. Chronic exposure can damage the teeth and irritate the lungs, causing bronchitis, coughing, and shortness of breath. A single high exposure can permanently damage the lungs.

ETHYLENE OXIDE

Ethylene oxide is a colorless gas that is highly flammable, reactive, and explosive. It is used to make antifreeze, polyesters, and detergents, and is used for industrial sterilization. Acute exposure can irritate the eyes, skin, nose, throat, and lungs, and may cause shortness of breath, headache, nausea, vomiting, diarrhea, drowsiness, weakness, and loss of muscle control. Higher exposure levels may cause loss of consciousness, fluid in the lungs (pulmonary edema), and death. Chronic exposure to ethylene oxide may cause cancer and birth defects, as well as damage to the liver, kidneys, and nervous system.

FORMALDEHYDE

Formaldehyde is a flammable, colorless gas with a pungent, suffocating odor. It is used in manufacturing plastics and other chemicals, such as adhesive resins in particleboard, plywood, foam insulation, and other products. Acute exposure irritates and burns the skin, eyes, nose, mouth, and throat. Higher levels can cause a build-up of fluid in the lungs (pulmonary edema) or spasm in the windpipe, either of which may be fatal. Chronic exposure may cause both an asthma-like allergy and bronchitis with symptoms of coughing and shortness of breath. Formaldehyde causes cancer of the nasal passages in animals and is a probable human carcinogen.

FURAN

Furan is a clear, colorless liquid with a pleasant odor. It is used in making chemicals, resins, pharmaceuticals, and insecticides. Vapors are explosive and heavier than air. Acute inhalation exposure can irritate the nose, throat, and lungs, leading to headache, fatigue, depression, nausea, vomiting, unconsciousness, and respiratory paralysis. Higher exposures may cause a buildup of fluid in the lungs (pulmonary edema) and death.

HYDROGEN CHLORIDE (HYDROCHLORIC ACID)

Hydrogen chloride is a corrosive colorless to slightly yellow gas with a strong odor. It is used in chemical manufacturing, metal processing, oil well extraction, and semiconductor etching, among other applications. Acute exposure to hydrogen chloride can cause severe burns of the skin and eyes, leading to permanent damage and blindness. Breathing hydrogen chloride vapor irritates the mouth, nose, throat, and lungs, causing coughing, shortness of breath, fluid buildup in the lungs (pulmonary edema), and possibly death. Chronic exposure damages the lungs and may erode the teeth.

HYDROGEN FLUORIDE (HYDROFLUORIC ACID)

Hydrogen fluoride is a corrosive colorless fuming liquid or gas with a strong irritating odor. It is used in etching glass and in making other chemicals and refining gasoline. Breathing the vapor causes extreme respiratory irritation (with cough, fever, chills, and tightness) that may be fatal. Contact can severely burn the skin and eyes, resulting in permanent eye damage or blindness. Long-term exposure may damage the liver and kidneys, and causes fluorosis, with symptoms of weight loss, malaise, anemia, and osteosclerosis.

OLEUM (FUMING SULFURIC ACID)

Oleum is a solution of sulfur trioxide mixed with sulfuric acid. See description of sulfur trioxide for health effects.

PHOSGENE

Phosgene is a colorless gas, or a clear to yellow volatile liquid used in making isocyanates, pesticides, resins, polyurethane, dyes, and other chemicals. Phosgene is highly corrosive. Short-term exposure can irritate and severely burn the skin and eyes, causing permanent damage. Breathing phosgene can irritate the nose, throat, and lungs; higher levels can cause fluid to build up in the lungs (pulmonary edema), a medical emergency. Repeated exposures to even very low levels can cause permanent lung damage (including emphysema, bronchitis).

SULFER DIOXIDE (ANHYDROUS)

Sulfur dioxide is a colorless gas with a sharp pungent odor. It may be shipped and stored as a compressed liquefied gas. Sulfur dioxide is used in the manufacture of sulfuric acid, sulfur trioxide, and sulfites; as a bleaching agent; in food processing; and to de-chlorinate wastewater, among other uses. Acute exposure irritates the eyes and air passages. High exposures to the skin and eyes can cause severe burns and blindness, and breathing high levels can lead to permanent lung damage and death.

SULFUR TRIOXIDE

Sulfur trioxide is a corrosive colorless liquid that fumes in the air, forming sulfuric acid vapor or mist. Its health effects in the air are essentially those of sulfuric acid mist and are similar to sulfur dioxide and to oleum. Sulfur trioxide vapor can severely irritate and burn the skin, eyes, throat, and lungs. Eye damage can include blindness. Breathing the vapor can lead to choking, spasm, and pulmonary edema. Exposure can cause bronchitis, emphysema, and permanent lung damage.

Endnotes

1 Homeland Security Council and Department of Homeland Security, "National Planning Scenario 8: Chemical Attack—Chlorine Tank Explosion" (2005).

2 Agencies and organizations that have warned about the chemical terror threat include, among others, the Department of Homeland Security, Department of Justice, Government Accountability Office, Agency for Toxic Substances and Disease Registry, Congressional Budget Office, Congressional Research Service, Army Surgeon General, Environmental Protection Agency, Naval Research Laboratory, Brookings Institution, Rand Corporation, American Chemistry Council, PACE International Union (United Steelworkers), International Brotherhood of Teamsters, Environmental Defense, U.S. Public Interest Research Group, and Center for Strategic and International Studies.

3 International Brotherhood of Teamsters, "High Alert: Workers Warn of Security Gaps on Nation's Railroads" (2005).

4 The Safe Drinking Water Act, as amended by the Bioterrorism Act of 2002, requires some drinking water facilities to prepare a security vulnerability assessment, but does not require these water facilities to prepare or carry out a comprehensive security plan.

5 A legislative timeline from 1999 to early 2006 is included in: Center for American Progress, "Preventing Toxic Terrorism: How Some Chemical Facilities are Removing Danger to American Communities" (2006).

6 Center for American Progress, "Preventing Toxic Terrorism: How Some Chemical Facilities are Removing Danger to American Communities" (2006).

7 Center for American Progress, "Toxic Trains and the Terrorist Threat: How Water Utilities Can Get Chlorine Gas Off the Rails and Out of American Communities" (2007).

8 Working Group on Community Right-to-Know/Right-to-Know Network, "Chemical Plant Security Breaches in the News" (2007).

9 National Research Council, "Making the Nation Safer: The Role of Science and Technology in Countering Terrorism" (2002).

10 See Table 3 in DHS-2006-0073: Department of Homeland Security, "Regulatory Assessment: Chemical Facility Anti-Terrorism Standards Interim Final Rule" (2007).

11 Edward R. Hamberger, Association of American Railroads, Statement before the U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Railroads, June 13, 2006.

12 Risk Management Solutions, Inc., "Catastrophe, Injury, and Insurance: The Impact of Catastrophes on Workers Compensation, Life, and Health Insurance" (2004).

13 Center for American Progress, "Preventing Toxic Terrorism."

14 Center for American Progress, "Toxic Trains and the Terrorist Threat."

15 Federal reading rooms are listed at www.epa.gov/oem/content/rmp/readingroom.htm. Portions of the RMPs other than off-site consequences analyses, such as general facility information, can be viewed through the Right-to-Know Network at http://data.rtknet.org/rmp.

16 An early EPA review of RMPs reported that "the median endpoint distance for toxic worst-case scenarios is 1.6 miles, while the median endpoint distance for flammable worst-case scenarios is 0.4 miles." James C. Belke, "Chemical Accident Risks in U.S. Industry: A Preliminary Analysis of Accident Risk Data from U.S. Hazardous Chemical Facilities" (Washington: Environmental Protection Agency, 2000).

17 Disregarding the most dangerous chemical *and* using identified alternatives at each of the top 101 facilities would remove the potential for an off-site toxic gas release from approximately two-thirds of the facilities, either because these facilities have no additional RMP toxic chemicals or because using the identified alternatives would eliminate such chemicals. More than 100 million people would be removed from harm's way if the 303 facilities listed in this report converted to the identified alternatives.

18 Association of American Railroads, "Homeland Security Committee Urged to Consider Safer Chemicals; Chemical Companies Should Stop Manufacturing Extremely Dangerous Chemicals" (2008).

19 Rail shipments of toxic inhalation hazard gases in the United States account for 59 percent of tonnage and 95 percent of ton-miles among all modes of transport. General Accounting Office, "Rail Safety and Security: Some Actions Already Taken to Enhance Rail Security, but Risk-based Plan Needed" (2003).

20 U.S. producers of liquid bleach without bulk transportation or storage of chlorine gas include: Odyssey Manufacturing, Tampa, Fla.; BleachTech, Seville, Ohio, and Petersburg Va. (under construction); Kuehne Chemical, Delaware City, Del.; and K2 Pure Solutions in California and Chicago, Ill. (under development).

21 K2 Pure Solutions, "Making Life Safer" (2008).

22 An additional top-tier facility, not listed in Appendix A, is the Chemical Unloading Facility, Perris, Calif., which supports drinking water treatment through trans-loading chlorine gas from rail to truck. This facility is not currently in use but is under proposal to resume operations.

23 Reported disinfection treatments for public water systems serving more than 100,000 people. Environmental Protection Agency, "Safe Drinking Water Information System" (2007).

24 Center for American Progress, "Preventing Toxic Terrorism."

25 Government Accountability Office, "Securing Wastewater Facilities: Utilities Have Made Important Upgrades, but Further Improvements to Key System Components May be Limited by Costs and Other Constraints" (2006).

26 Government Accountability Office, "Wastewater Facilities: Experts' Views on How Federal Funds Should Be Spent to Improve Security" (2005); National Drinking Water Advisory Council, "Findings of the Water Security Working Group," (2005)—conveyed to EPA June 3, 2005; Chemical Safety and Hazard Investigation Board, "Investigation Report: LPG Fire at Valero-McKee Refinery" (2008).

27 These water utilities report holding on-site more than the RMP threshold 2,500 pounds of chlorine gas at any one time, according to the EPA's RMP data as of April 25, 2008.

28 Manufacturers of equipment to produce bleach without bulk storage of chlorine gas include Powell Fabrication and Manufacturing (for larger facilities) and Electrolytic Technologies (for smaller facilities).

29 Euro Chlor, "Chlorine Industry Review 2006-2007" (2007).

30 U.S. Public Interest Research Group Education Fund, "Needless Risk: Oil Refineries and Hazard Reduction" (2005).

31 Solid acid alkylation technologies include InAlk from UOP-Honeywell and AlkyClean, developed jointly by Albemarle Catalysts, Lummus Global, and Neste Oil. An additional process for the regeneration of spent sulfuric acid alkylation catalyst by electrolysis is described in U.S. Patent 5,547,655.

32 Two petroleum refineries that use Reduce Volatile Alkylation Process, or ReVAP, modified hydrofluoric acid are Valero Energy, Wilmington, Calif. and Holly Refining, Woods Cross, Utah. Both refineries report in RMPs submitted to the EPA a vulnerability zone for a worst-case release of hydrofluoric acid that would encompass more than 200,000 people.

33 Three paper mills that converted off chlorine gas for different reasons are listed on pages 12 and 13 of CAP's "Preventing Toxic Terrorism" report.

34 U.S. Public Interest Research Group Education Fund, "Pulp Fiction: Chemical Hazard Reduction at Pulp and Paper Mills" (2007).

35 See Eka Chemicals, www.purate.com.

36 "Medical Management Guidelines for Sulfur Dioxide," available at www.atsdr.cdc.gov/mhmi/mmg116.html (last accessed November 2008).

37 Vendors of sulfur-burning equipment include, among others, MECS Inc. and Chemithon Enterprises Inc.

38 See "Learn More About Sulphur" and "Sulphur 101," available at www.sulphurinstitute.org (last accessed September 2008).

39 See for example Southern Ionics Inc., www.southernionics.com.

40 An additional fertilizer manufacturing facility, Agriform, Woodland, Calif., reports 1,011,979 people within a 12-mile vulnerability zone. However, this vulnerability zone population is plainly overstated within a 12-mile radius of the facility, and for this reason the facility is not included among the top 101 highest-hazard facilities in this report.

41 Direct uses of ammonia as fertilizer can be broken down as: anhydrous ammonia (26 percent); urea/ammonium nitrate solutions (23 percent); urea (20 percent); ammonium nitrate (4 percent); ammonium sulfate (2 percent); other forms (3 percent); and multiple nutrient forms (21 percent). Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Ammonia" (2004).

42 See for example Clean Harbors, Bristol, Conn., in CAP's "Preventing Toxic Terrorism" report.

43 The United Soybean Board lists seven companies that produce vegetable-based polyols at www.soynewuses.org/ProductsGuide/Ingredients_Industrial-Plastics.aspx.

44 For example, PVS Technologies in Augusta, Ga., switched from rail to pipeline supply of chlorine gas, eliminating a worst-case chemical release vulnerability zone that formerly encompassed 290,000 people.

45 European Chemical Industry Council, "Chemistry Sectors/Colourants & Fillers/Titanium Dioxide Manufacturers Association" available at www.cefic.org (September 2008).

46 The first commercial route to butanediol used acetylene and formaldehyde. Other routes include processes used or designed by Mitsubishi Chemicals, Lyondell (propylene oxide), BP/Lurgi, Darien, Aker Kvaerner, Huntsman (maleic anhydride), and Davy Process Technologies.

47 For PVC substitute materials, see Frank Ackerman and Rachel Massey, "The Economics of Phasing Out PVC" (Boston: Tufts University, 2003); web resources from the Healthy Building Network, available at www.healthybuilding.net/pvc/index.html.

48 Joe Thornton, *Pandora's Poison: Chlorine, Health, and a New Environmental Strategy* (Cambridge: MIT Press, 2000); Charles River Associates for the Chlorine Institute, "Assessment of the Economic Benefits of Chlor-Alkali Chemicals to the United States and Canadian Economies" (1993).

49 Vulnerability zones for power plants using anhydrous ammonia average 21,506 people over 3.56 miles, and for power plants using aqueous ammonia 205 people over 0.35 miles. Working Group on Community Right-to-Know, "Unnecessary Dangers: Emergency Chemical Release Hazards at Power Plants" (2004).

50 Congressional Research Service, "Memorandum to the Honorable Edward Markey: RMP Facilities in the United States as of February 2008" (2008).

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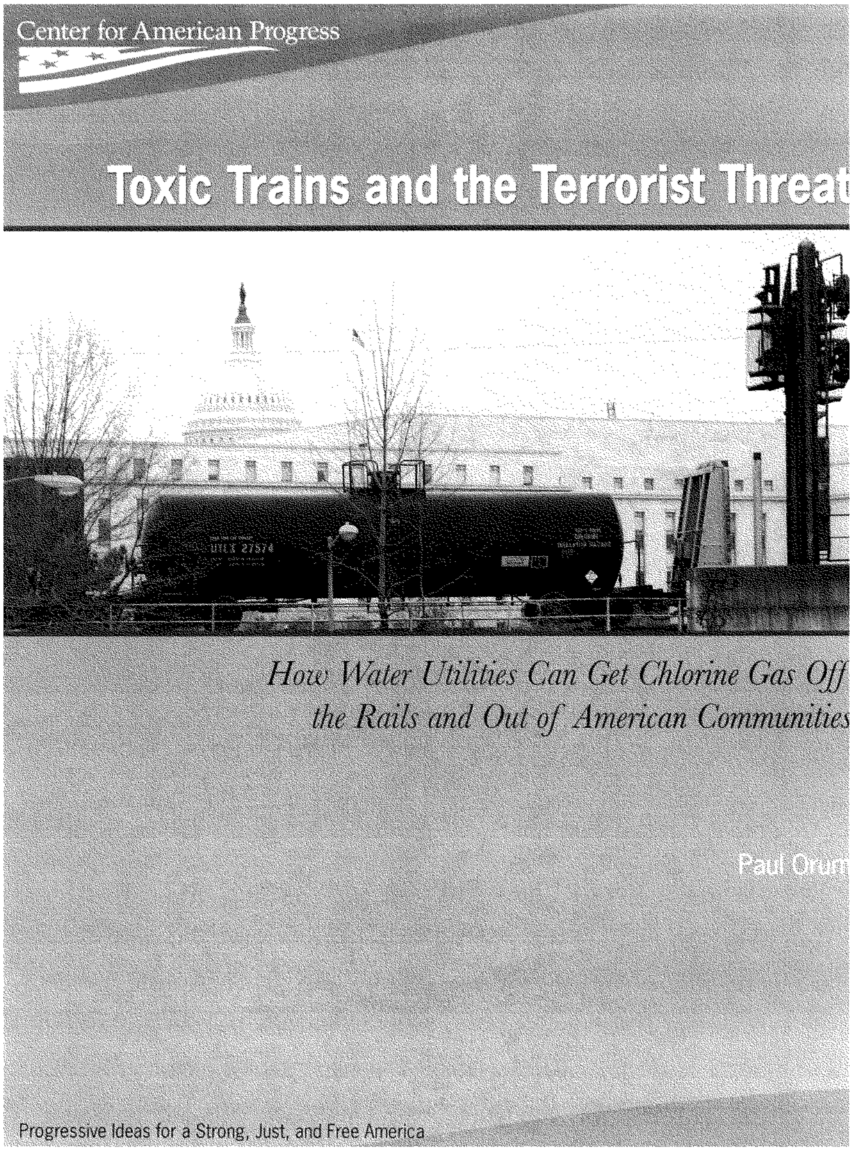

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Toxic Trains and the Terrorist Threat

How Water Utilities Can Get Chlorine Gas Off the Rails and Out of American Communities

Paul Orum

Progressive Ideas for a Strong, Just, and Free America

TOXIC TRAINS AND THE TERRORIST THREAT

How Water Utilities Can Get Chlorine Gas Off the Rails and Out of American Communities

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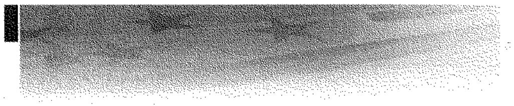


Executive Summary

Each year, thousands of tons of highly toxic chlorine gas travel by rail in the United States to drinking water and wastewater treatment facilities and other industries. These massive railcars traverse some 300,000 miles of freight railways, passing through almost all major American cities and towns. A rupture of one of these railcars could release a dense, lethal plume for miles downwind, potentially killing or injuring thousands of people.

The Department of Homeland Security and numerous security experts have repeatedly warned that terrorists could use industrial chemicals as improvised weapons of mass destruction—and indeed, terrorists recently attacked and blew up several trucks carrying chlorine in Iraq. In this respect, railcars of chlorine gas represent a distinct national security vulnerability. Yet Congress and the Bush administration have not acted to eliminate unnecessary uses of chlorine gas railcars even where undeniably affordable and practical alternatives exist.

To examine this vulnerability and encourage action, the Center for American Progress surveyed water utilities that still receive chlorine gas by rail, as well as utilities that since 1999 have eliminated chlorine railcars by switching to a less hazardous disinfectant. Our major findings are shown in the box on page 3.

Just 37 drinking water and wastewater treatment facilities still receive chlorine gas by rail. More than 25 million Americans live in harm's way near these facilities,[1] while millions more live in cities and towns along the rail delivery routes.

The good news is this vulnerability can be removed. Since 1999, some 25 water utilities that formerly received chlorine gas by rail have switched to safer and more secure water treatment options, such as liquid bleach or ultraviolet light. These alternative treatment options eliminate the danger of a catastrophic toxic gas cloud. As a result, more than 26 million Americans who live near these facilities are safer and more secure.

These conversions also remove the threat to communities along rail delivery routes. Railroads, by their nature, are wide open and largely insecure, providing easy access to railcars—as evidenced by the graffiti that frequently marks them (see photo on page 15). This makes it practically impossible to provide security commensurate with the risk presented by railcars of chlorine gas.

The only way to truly protect communities is to get unnecessary toxic cargoes off the tracks. Converting to safer alternatives for water treatment does that.

There continues to be some progress in this direction. At least six water utilities that now use chlorine-gas railcars are in the process of converting operations. Nonetheless, many others contacted by this survey have no plans to change.

Cost was a frequently cited reason for not converting. But the survey found such conversions are affordable even at large facilities, costing no more than $1.50 per person served each year—or the price of a bag of potato chips—and often much less. Put another way, a single day's expenditures on the war in Iraq could cover construction costs of converting the remaining U.S. water utilities off chlorine gas railcars. Cost is not a sufficient justification to continue to jeopardize American communities with massive railcars of chlorine gas.

State and local governments may provide incentives for water utilities to switch from chlorine gas. But communities along the rails have little or no local control over toxic trains that pass by homes, workplaces, and schools. The plant conversions identified in this report are positive, but without a national strategy, these communities will be much less secure than they should be.

Washington, D.C., for example, quickly converted its sewage treatment plant from chlorine gas railcars to liquid bleach in the aftermath of the Sept. 11, 2001, terrorist attacks. But hazardous chemicals, including chlorine gas, are still being transported by rail through the District just a few city blocks from the U.S. Capitol building—an intended target on 9/11.

In response, the city government sought to reroute toxic trains around the city. The Bush administration, however, has backed a lawsuit to block local control, arguing that local governments lack legal authority to protect citizens by rerouting trains.

The story is the same in other cities that have converted water utilities from chlorine-gas railcars, such as Cleveland and Indianapolis. Despite converting, these cities are still at risk from chlorine-gas railcars headed to other cities that have not converted, such as Minneapolis and Nashville.

A comprehensive solution can only come from the federal level. In fact, judges in the ongoing litigation over rerouting in Washington, D.C., have encouraged the Bush administration to develop a national strategy to address the security and safety dangers involved in the manufacture, use, and transportation of chlorine gas and other hazardous chemicals. Unfortunately, the administration and Congress have largely ignored this advice.

After years of inaction, and under growing public pressure, temporary and cosmetic chemical security legislation was enacted in October 2006 requiring the Department of Homeland Security to promulgate chemical-plant security regulations by April 4, 2007. But the legislation exempts water utilities, does not address transportation security concerns, and neglects safer and more secure technologies. Thus, among other shortcomings, DHS's new regulations will do nothing to address the risk posed to tens of millions of Americans by unnecessary rail shipments of chlorine gas to water utilities.

To address this danger and other chemical hazards, Congress must create meaningful national incentives. Among other actions, federal security standards should:

- Require chemical facilities to review and use available, cost-effective technologies that significantly reduce or eliminate serious emergency chemical release hazards;
- Target assistance to help water utilities convert from chlorine gas, including facilities that discontinued chlorine gas after Sept. 11, 2001;
- Give the Department of Homeland Security full authority to safeguard chemical infrastructure and the public, with appropriate roles for other governmental agencies; and
- Require chemical facilities to account for transportation risks—including the possibility of a catastrophic chemical release—in developing security assessments and plans.

Taking these actions would remove unnecessary toxic cargoes from the nation's railways and communities. The danger is immense and the solutions are clear. What we need now is action.

MAJOR FINDINGS

The Center for American Progress surveyed 62 water facilities that receive chlorine gas by rail or previously received chlorine gas by rail. These facilities treat an average of five billion gallons of drinking water and four billion gallons of wastewater each day, and serve more than 45 million people in two dozen states and the District of Columbia.[2] The survey identified facilities that have eliminated chlorine gas railcars, but also found others that have no plans to do so. Major survey findings include:

- **Only 24 drinking water and 13 wastewater facilities still use *rail shipments* of chlorine gas.** These facilities are found in California, Florida, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Nebraska, South Carolina, Tennessee, Texas, Utah, and Virginia. These facilities endanger more than 25 million Americans who live nearby, and millions more near railways that deliver the chlorine gas.
- **At least six drinking water and 19 wastewater facilities have eliminated *rail shipments* of chlorine gas since 1999 by switching to a less hazardous disinfectant.** These facilities are found in California, the District of Columbia, Florida, Georgia, Indiana, Kentucky, Louisiana, Maryland, Michigan, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, and Washington. Some 26 million people in nearby communities and millions more along rail delivery routes are no longer threatened by chlorine gas from these facilities. Additional water utilities eliminated chlorine gas rail shipments prior to 1999.[3]
- **Of facilities that still receive *rail shipments* of chlorine gas, at least four drinking water and two wastewater plants have definite plans to convert from chlorine gas to a safer, more secure disinfectant.** These facilities are found in Colorado, Florida, Kentucky, Louisiana, South Carolina, and Virginia. By converting, they will remove the threat to more than five million people living nearby, and millions more along their rail delivery routes. Several more such facilities are planning to convert within a few years, and others are evaluating alternatives.[4]
- **Chlorine gas rail shipments travel long distances through populated areas.** Some 16 chlorine production sites sell chlorine by rail to the merchant market. The profusion of freight rail lines precludes identifying specific routes between producers and water utilities. The locations of producers and chlorine-gas-using water utilities, however, make clear that rail shipments often cover hundreds or even thousands of miles.
- **General cost estimates provided by 20 water facilities indicate that switching from chlorine gas to a safer, more secure disinfectant is affordable.** Conversions at these facilities cost no more than $1.50 per person served each year—or the price of a bag of potato chips—and often cost much less. A single day's expenditures on the war in Iraq could easily have paid to convert these 20 facilities off chlorine gas.

Dangerous State of Play

Chemical Railcars Pose Serious Hazards

Exposure to chlorine gas can severely burn the eyes, skin, and lungs, and can be fatal. When released from a railcar, compressed chlorine expands rapidly into a ground-hugging poison gas cloud. A single ruptured railcar of chlorine gas can release a dense, lethal plume from 14 miles to 25 miles downwind in worst-case conditions.[5] In large urban areas, thousands of people could be killed or seriously injured in these conditions.

The Department of Homeland Security estimates that a major chlorine railcar spill could kill 17,500 people.[6] A Naval research lab likewise found that such a spill could quickly cause 100,000 serious injuries or deaths under a scenario involving large holiday crowds.[7]

This risk is especially worrisome given the vulnerability of railcars. A RAND Corp. database of worldwide terrorist incidents recorded over 250 attacks against rail targets from 1995 to 2005.[8] Insurgents in Iraq have recently targeted trucks carrying chlorine gas with several deliberate attacks.[9]

The graffiti on many railcars attests to their vulnerability. A survey of rail workers reported widespread lax security at rail yards.[10] Investigative news reports repeatedly show easy access to chemical facilities and rail cargoes.[11] A *Pittsburgh Tribune* reporter recently found so little security he could leave his business card on dozens of railcars and locations.[12]

Railcars may travel or sit near schools, hospitals, homes, and downtowns with only nominal security, if any. The railroad carrier may simply park the chlorine railcar outside the water utility fence on an unpredictable schedule, leaving it for the facility to retrieve. Rail security regulations are minimal, yet because federal rules preempt state and local requirements, chemical railcars passing through communities are largely exempt from local control.

Major chlorine rail spills are infrequent but can be deadly. Chlorine rail spills killed eight people in Youngstown, Fla., in 1978; 17 people in Montanas, Mexico in 1981; three people near San Antonio, Texas in 2004; and nine people in Graniteville, S.C., in 2005. Since 1990, the National Response Center has recorded over 160 mostly-minor spill reports involving railroads and chlorine, or more than one every six weeks.[13]

Such spills reveal the overall vulnerability of the system. But a calculated terrorist rupture of a single chlorine-gas-filled railcar could have far worse consequences, potentially poisoning an entire community.

> *"We are happy not to have the chlorine gas there. In the end it was a no-brainer to switch."*
>
> *Bill McKeon, Chief-Wastewater, Philadelphia Water Department, Philadelphia, Pa.*

New Interim Chemical Security Rules Won't Fix the Problem

Many federal agencies and others have warned that terrorists could use chemical facilities as pre-positioned weapons of mass destruction.[14] Yet there are almost no federal chemical security requirements. Congress enacted temporary legislation in October 2006 that requires the Department of Homeland Security to promulgate interim, stopgap chemical security requirements by April 4, 2007.[15]

But this new law is seen as an incomplete measure that will ultimately be replaced by comprehensive legislation. It has significant shortcomings that leave millions of Americans vulnerable. In particular, the new regulations:

- Exempt drinking water and wastewater plants and other types of facilities;
- Do not require facilities to address the dangers, security costs, and potential liabilities of transporting extremely hazardous materials to or from their facilities; and
- Ignore cost-effective safer technologies that are the most effective way to reduce the attractiveness of chemical facilities as terrorist targets.

These regulations are too focused on physical security at facilities and do not do enough to emphasize supply chain security. Better fencing, lighting, and access controls are important, but insufficient—particularly if the delivery of hazardous materials to or from a facility travels by rail through a major urban center.

In 2006, the Transportation Security Administration released draft voluntary action items for securing rail transportation of toxic inhalation materials such as chlorine gas. Yet the voluntary recommendations lack enforcement, are vague on key elements (such as protecting railcars in transit), and are silent on feasible opportunities to take hazardous cargoes off the rails.

The Bioterrorism Act of 2002 provided substantial federal funding to drinking water facilities to conduct vulnerability assessments, but did not require these facilities to reduce any hazards or otherwise improve security. Similarly, there are no significant federal security standards for wastewater plants.

Homeland Security Presidential Directive 7 designated the U.S. Environmental Protection Agency as the lead agency to oversee security at drinking water and wastewater facilities.[17] The EPA could require preventive security at water utilities under the general duty clause of the Clean Air Act. The Bush administration, however, blocked a specific proposal developed by EPA and the then Office of Homeland Security (now DHS) to use this authority to establish federal chemical security standards.[18]

Less Hazardous Alternatives Are Available

In 2006 the National Research Council reported that "the most desirable solution to preventing chemical releases is to reduce or eliminate the hazard where possible," including by modifying processes or replacing hazardous materials with less hazardous substitutes.[19] Two years ago, the Center for American Progress recommended an action plan for safeguarding hazardous chemical facilities using these techniques,[20] and one year ago released survey findings that documented some 284 facilities across diverse industries that had switched to less acutely hazardous options.[21]

The Association of American Railroads supports development of less hazardous products and technologies as substitutes for highly hazardous materials. In congressional testimony, the association explained that chlorine gas and other "toxic inhalation hazard," or TIH, chemicals comprise just 0.3 percent of all rail shipments, but railroads face potentially ruinous liability from hauling these chemicals (which they are required to carry). For this reason, the railroads "strongly support efforts aimed at finding and utilizing 'inherently safer technologies' as substitutes for hazardous materials, especially TIH" that are shipped by rail.[22]

Roughly two-thirds of large U.S. wastewater utilities already use a disinfectant chemical other than chlorine gas, or plan to stop using chlorine gas.[23] At least 160 large U.S. public drinking water systems already use liquid bleach.[24] In last year's survey, the Center for American Progress identified more than 200 drinking water or wastewater facilities that had eliminated chlorine gas since 1999—a sample of similar changes at many water utilities nationwide.[25] Most of these water facilities switched to liquid bleach, while others use ultraviolet light.

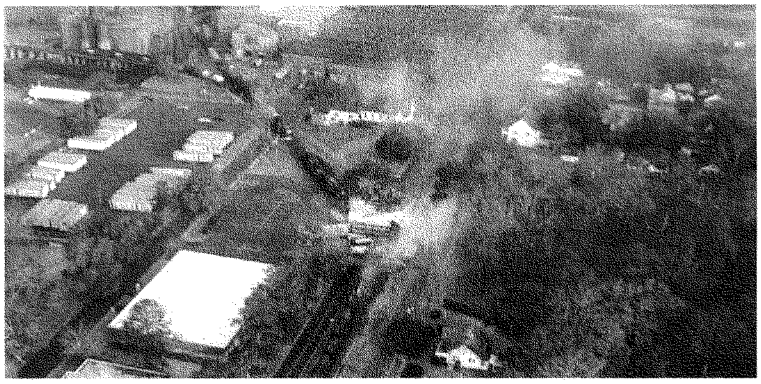
Last year's report noted that approximately 1,700 drinking water plants and 1,150 wastewater facilities report extremely hazardous substances, primarily chlorine gas, under EPA's Risk Management Planning program. This year's survey report focuses on just those water utilities that recently have received chlorine gas by rail.

Utilities that eliminate chlorine gas may replace other hazardous chemicals. Some wastewater facilities remove chlorine from effluent by using anhydrous sulfur dioxide, a dangerous toxic gas. These facilities frequently replace anhydrous sulfur dioxide with less hazardous sodium bisulfite. Similarly, some drinking water facilities replace anhydrous ammonia, a toxic gas, with aqueous ammonia, a less hazardous alternative.

Replacement Chemicals Can Be More Safely Produced

Water utilities can buy concentrated bleach in bulk as sodium hypochlorite, or generate dilute bleach on-site from salt and electricity. Recent high prices for chlorine make on-site generation increasingly attractive even for larger water utilities. Several facilities surveyed in this report are considering or adopting on-site bleach, while others are considering or adopting ultraviolet light. Both options eliminate bulk transportation of extremely hazardous substances and greatly reduce overall transportation needs.

In our survey for this report, we found many utilities that eliminated chlorine gas now buy bulk sodium hypochlorite bleach. One argument against converting water utilities to bleach is that it simply shifts the danger to bleach manufacturing facilities,



A freight train derailed on Jan. 6, 2005, in Graniteville, S.C., rupturing a railcar of chlorine gas. The leaking gas visible in the photo above killed nine people, sent 500 to the hospital with breathing problems, and caused more than 5,000 to evacuate for several days. (U.S. EPA) which typically make hypochlorite from bulk rail shipments of chlorine gas. Producers, however, can manufacture hypochlorite using "just-in-time" technology, in which chlorine gas is created and promptly used only in small amounts, eliminating the danger of a catastrophic gas release.

This process is used in Asia, Australia, Europe, and a few U.S. locations.[26] Further industrial-scale production is under development in the United States.[27] Currently, some 94 manufacturers across the country produce sodium hypochlorite for use in industrial or household products.[28] Full conversion to producing hypochlorite without bulk chlorine gas would eliminate thousands of rail shipments each year and take millions of Americans out of harms way.

> *"We are very glad the chlorine gas is gone. It's an achievement. It used to be our number one employee concern."*
>
> *Ray Flasco, Water Supply Division Manager, Akron Water Supply Plant, Kent, Ohio*

Producing hypochlorite bleach from bulk chlorine gas is currently marginally cheaper than using safer and more secure methods—but only insofar as companies do not pay the full costs of security and liability insurance for a potential catastrophic chlorine release. Requiring producers that use bulk chlorine gas to internalize these costs would immediately make large-scale production using safer and more secure methods cost-competitive.

Major Survey Findings

Few Water Utilities Still Use Chlorine Gas Railcars

Only 24 drinking water and 13 wastewater facilities still use *rail shipments* of chlorine gas. Yet because of these few facilities, thousands of tons of deadly chlorine gas pass through major American cities. Some 25 million Americans live within range of a worst-case toxic gas release around these facilities, and millions more live along rail delivery routes. Among these 37 facilities are:

- St. Paul Regional Water Services-McCarron, Maplewood, Minn., 1.3 million people at risk
- Kansas City, Missouri Water Treatment Plant, 720,000 people at risk
- Omohundro Water Treatment Plant, Nashville, Tenn., 973,663 people at risk
- East Bank Wastewater Treatment Plant, New Orleans, La., 726,185 people at risk*
- Central Regional Wastewater System, Grand Prairie (Dallas), Texas, 3.9 million people at risk

For a complete list see Appendix A on page 16 and the map on page 11.

Many Water Utilities Have Switched to Safer, More Secure Alternatives

At least six drinking water and 19 wastewater facilities have eliminated *rail shipments* of chlorine gas by switching to a less hazardous disinfectant since 1999. As a result, more than 26 million people no longer live within range of a chlorine gas release from these facilities, and additional millions are no longer in danger from rail shipments to these facilities. Among these 25 facilities are:

- Wyandotte Wastewater Treatment Facility, Wyandotte, Mich., 1.1 million people no longer at risk
- Baldwin Water Treatment Plant, Cleveland, Ohio, 1.4 million people no longer at risk

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* Population before hurricane Katrina. Facility intends to convert to liquid bleach but lacks dedicated funding amid extensive post-Katrina needs.

- Metropolitan Wastewater Treatment Plant, St. Paul, Minn., 520,000 people no longer at risk
- Joint Water Pollution Control Plant, Carson, Calif. (Los Angeles County), 210,000 people no longer at risk
- White River Water Treatment Plant, Indianapolis, Ind., 968,579 people no longer at risk

For a complete list see Appendix B on page 18 and the map on page 11. Additional water utilities eliminated chlorine gas rail shipments prior to 1999.[29]

Some Additional Water Utilities Are Eliminating Chlorine Gas

Of the 37 water facilities that still use chlorine railcars, at least four drinking water and two wastewater plants are currently converting to a safer, more secure disinfectant with at least partial construction planned by 2008. Completing these conversions will cut chemical hazards for five million people who live nearby and many others along freight railways. Facilities with well-developed plans to convert include:

- Metro Wastewater Reclamation District, Denver, Colo., 925,000 people at risk
- City of Richmond Water Purification Plant, Richmond, Va., 704,630 people at risk
- Carrollton Water Purification Plant, New Orleans, La., 892,320 people at risk**

Several other facilities may convert within a few years, and others are evaluating alternatives. Two other facilities (in Stockton and San Jose, Calif.) occasionally use liquid bleach as an available backup, but are evaluating more serviceable long-term solutions such as ultraviolet light.

Chlorine Gas Railcars Travel Over Long Distances

Each year, approximately 45,000 shipments of chlorine gas travel by rail in the United States. These shipments may travel over more than 300,000 miles of freight railways across the country.[30] Rail lines pass through almost all major American cities and towns.

The 16 chlorine production sites listed in Appendix C reportedly sell chlorine by rail to water utilities through the merchant market. Usually, a distributor company moves the chlorine gas from the original manufacturer to the water utility. These rail shipments may travel long distances—hundreds or even thousands of miles—passing through densely populated cities and towns. There is no legal requirement to use the closest supplier or the safest route.

The large water utilities covered by this report account for only a small portion of the chlorine on the rails—but are by their nature located in or near large cities or towns. Producers also ship to chlorine packaging locations and sodium hypochlorite bleach production facilities. Additional destinations include PVC plastics producers, some paper mills, and chemical manufacturers. Roughly two-thirds of chlorine is never shipped, but rather is used on-site in chemical manufacturing or is moved by pipeline to nearby facilities. For this very reason, chemical manufacturers may co-locate to avoid shipping chlorine gas.[31]

The profusion of freight rail lines precludes identifying specific routes between producers and water utilities. However, the map on page 11 illustrates the long distances that rail shipments must travel between manufacturers and the few water utilities that still receive chlorine gas by rail.

> *"As a plant operator it's a weight off your shoulders if you don't have that risk of chlorine gas."*
>
> *Nick Frankos, Plant Manager, Back River Wastewater Plant, Baltimore, Md.*

** Population before hurricane Katrina.

Utilities Cited a Number of Reasons for Switching

Personnel at water facilities that eliminated chlorine gas were generally relieved to be rid of it and considered the change an achievement. Reasons and advantages for switching included: improving safety and security; meeting discharge requirements; reducing liability exposure; cutting costs of preventive maintenance, training, emergency planning, and regulatory compliance; mitigating on-site security costs associated with chlorine gas; and previous experience with chlorine leaks.

> *"Maintenance cost… priceless! No special training or emergency repair kits to keep on hand. We do all our repairs in-house where chlorine required an outside contractor. The Fire Department loves us. No more emergency drills and training."*
>
> *John Garvin, Operation and Maintenance Manager, Regional Water Resource Agency, Owensboro, Ky.*

Most surveyed facilities that have not converted are evaluating disinfectant options. These facilities cited as potential obstacles: costs of capital and replacement chemicals; the large size of the utility and needed chemical volumes; storage space and shelf life of liquid bleach; requirements to maintain backup disinfection capability; and the need for reliable information on alternatives.

Some facilities also noted investments in chlorine-gas security, such as containment buildings, sensors, and scrubbers. Such sunk costs may create a disincentive to further change yet do nothing to protect incoming rail shipments.

Conversion Costs Are Manageable

Twenty facilities provided general information on the construction and operating costs of converting off chlorine gas railcars. Switching these facilities to a safer, more secure disinfectant is affordable, costing no more than $1.50 per year per person served—the price of a bag of potato chips—even without accounting for important cost savings. Many facilities are spending well less than that amount. Examples are described in the box on pages 12–13.

Cost figures varied widely depending on facilities' specific circumstances and the information available to respondents. Some facilities, for example, needed to upgrade aging infrastructure; others did not. While many respondents were able to estimate construction and chemical costs, most found it difficult to compile information on *avoided* costs from readily available sources. Some facilities, however, identified important savings in preventive maintenance, emergency planning, employee training, regulatory compliance, future site security, or other factors.

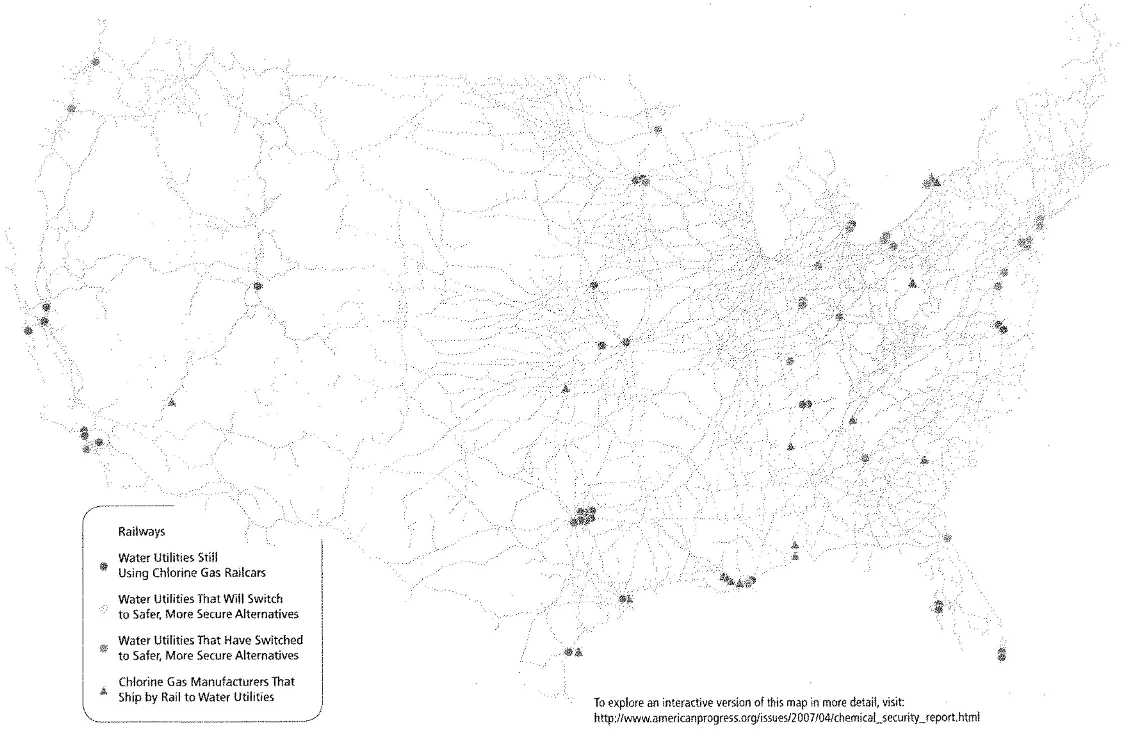
Facilities using chlorine gas face new demands to upgrade physical security to protect against a possible terrorist attack. Current practices include at best such meager physical security measures as better fences, vehicle gates, lights, employee identification, and cameras. Some facilities may also have enclosures and gas scrubbers that attempt to contain an emergency release. Converting from chlorine gas mitigates these costs while providing superior protection to employees and surrounding populations.

After all, there is little reason to believe that current security practices would be able to withstand a well-executed attack by an armed intruder. Nor does enhanced physical security do anything to protect railcars in transit to the facility.

The Government Accountability Office is currently conducting a review of costs associated with conversion of water utilities to less hazardous chemicals. This GAO report is expected in spring 2007.

Unnecessary Rail Shipments of Chlorine Gas Endanger Millions

Shown are 37 water utilities that still receive chlorine gas by rail. Distributors ship railcars of chlorine gas from 16 manufacturers to these utilities—frequently over long distances and through densely populated areas. Also shown are 25 water utilities that since 1999 have eliminated railcar shipments of chlorine gas by converting to safer, more secure alternatives for water treatment. Millions of people along railroads are no longer endangered by chlorine gas shipments to these utilities. Of utilities that still receive chlorine gas by rail, at least six more have firm plans to convert from chlorine gas within two years.


Railways
● Water Utilities Still Using Chlorine Gas Railcars
○ Water Utilities That Will Switch to Safer, More Secure Alternatives
● Water Utilities That Have Switched to Safer, More Secure Alternatives
▲ Chlorine Gas Manufacturers That Ship by Rail to Water Utilities

To explore an interactive version of this map in more detail, visit:
http://www.americanprogress.org/issues/2007/04/chemical_security_report.html

CONVERSION COSTS AT SPECIFIC FACILITIES

These 20 water utilities were able to convert from chlorine gas railcars to effective alternatives at a reasonable cost.[32] A single day's expenditures on the war in Iraq could have easily paid for all these conversions.

- **The Metropolitan Wastewater Treatment Plant in St. Paul, Minn.,** switched from chlorine gas railcars to liquid bleach in late 2005. The aging plant required upgrades that were projected to cost about the same whether staying with chlorine gas or switching to liquid bleach. Actual construction cost $7.8 million, and chemical costs increased $85,000 per year. Annual operating costs of preventive maintenance, energy, and emergency preparedness decreased about $65,000, while in-plant security decreased an estimated $35,000. The entire metropolitan wastewater system serves about 2.4 million people; annual conversion costs, including otherwise necessary construction, are about 20 cents per person served.

- **The Columbia Boulevard Wastewater Treatment Plant in Portland, Ore.,** switched from chlorine gas railcars to liquid bleach in 2005. Construction cost $4.4 million, and increased chemical costs are more than offset by operating savings anticipated from reduced need for maintenance, electric power, training, labor, and emergency planning. The facility serves some 550,000 people, who will benefit from the offset of operating costs in the long term.

- **The Akron Water Supply Plant in Kent, Ohio,** switched from chlorine gas railcars to liquid bleach in 2004. Construction cost about $1.1 million (or one-fourth the cost of a new chemical building) and operating costs increased about $65,000 per year, primarily to cover chemicals. The facility, however, avoided over $1.2 million in construction costs by eliminating chlorine gas. By switching, the facility avoided constructing a containment building to enclose railcars ($308,000), installing an emergency gas scrubber ($598,000), and upgrading certain process equipment such as a chlorine gas evaporator ($369,000). Even without considering avoided costs, the facility's 280,000 customers pay only approximately 50 cents more each year.

- **The Edward P. Decher Secondary Wastewater Plant in Elizabeth, N.J.,** switched from chlorine gas to liquid bleach in 2003. Construction upgrades cost $750,000 and chemical costs increased $291,000 from 2002 to 2004, while maintenance and training costs decreased an estimated $70,000 per year. The facility serves about 500,000 people; annual conversion costs are about 55 cents per person served.

- **The South Treatment Plant in Renton, Wash.,** switched from chlorine gas to liquid bleach in 2003. Construction cost $2.4 million, and chemical costs increased about $350,000 per year. The entire wastewater system serves about 1.4 million people; without accounting for any operating savings, annual conversion costs are less than 40 cents per person served.

- **The Western Lake Superior Sanitary District in Duluth, Minn.,** switched from chlorine gas to liquid bleach in 2006. Construction cost $1.6 million. Operating costs initially remained about the same, with increased chemical costs offset by decreased demurrage charges that resulted from keeping a chlorine railcar on-site. A newly revised discharge permit will likely lengthen the disinfection season and increase chemical costs in the future. The facility serves 110,000 people; annual conversion costs are thus far about a dollar per person served.

- **Crescent Hill Water Treatment Plant in Louisville, Ky.,** is building an on-site generating facility for bleach disinfectant at an estimated capital cost of roughly $10 million. Accounting for depreciation, the facility estimates the cost of switching over from chlorine gas at about $500,000 annually. The entire water system serves about 850,000 people; estimated annual conversion costs are about 60 cents per person served.

- **The City of Richmond Water Purification Plant in Richmond, Va.,** is switching from chlorine gas railcars to liquid bleach in early 2007. Construction cost $11 million for a new building, about one-third directly linked to storage of liquid bleach. Chemical costs are anticipated to increase $450,000 per year. The facility serves about 500,000 people;

without accounting for any operating savings, annual conversion costs are about $1.50 per person served.

- **Blue Plains Sewage Treatment Plant in Washington, D.C.,** switched from chlorine gas railcars to liquid bleach immediately after September 11, 2001. According to the plant's chief engineer at the time, the change adds about 25 cents per month to the average household customer's utility bill.[33]

- **The Nottingham and Baldwin drinking water treatment plants in Cleveland, Ohio** completed conversion from chlorine gas to liquid bleach in late 2002 and 2005, respectively. Construction cost an estimated $2,475,000 for both plants, and chemical costs increased about $208,000 per year. The Cleveland division of water serves some 1.5 million people; without accounting for any operating savings, annual conversion costs are less than 25 cents per person served.

- **The Buckman Water Reclamation Facility in Jacksonville, Fla.,** switched from chlorine gas railcars to ultraviolet light in 2001. Construction cost $6 million, including about $1 million for unrelated upgrades. Electricity costs increased about $150,000 per year over the previous cost of chlorine gas, but only if not considering recent dramatic chlorine price increases. The entire wastewater system serves about 575,000 people; annual conversion costs are about 80 cents per person served.

- **The Wyandotte Wastewater Treatment Facility in Wyandotte, Mich.,** switched from chlorine gas railcars to ultraviolet light in 2000. Construction cost $8 million, and operating costs increased from about $320,000 to $350,000 each year. The wastewater system serves about 415,000 people; annual conversion costs are about $1.30 per person served.

- **The Mill Creek Wastewater Treatment Plant in Cincinnati, Ohio,** switched from chlorine gas railcars to liquid bleach in 2001. Constructing a temporary conversion cost less than $40,000; planned permanent construction is projected to cost less than $3 million. Chemical costs increased about $290,000 per year. The entire metropolitan sewer district serves about 800,000 people; without accounting for any operating savings, annual conversion costs are about 60 cents per person served.

- **The City of Philadelphia** converted its Northeast, Southeast, and Southwest water pollution control plants from chlorine gas to liquid bleach. Capital costs for conversion were $5.9 million for all three plants, and chemical costs increased about $275,000 per year. After converting to liquid bleach, these facilities jointly save roughly $75,000 each year in reduced labor and risk management planning costs. The entire wastewater system serves about 2.2 million people; annual conversion costs are about 25 cents per person served.

- **Samuel S. Baxter Water Treatment Plant in Philadelphia, Pa.,** converted to liquid bleach in 2005. Construction costs were about $2 million, and chemical costs increased about $670,000 in 2006. Estimated savings on labor and emergency planning are at least $25,000 per year. The entire drinking water system serves about 1.6 million people; annual conversion costs are less than 50 cents per person served.

- **The Middlesex County Utilities Authority wastewater plant in Sayreville, N.J.,** switched from chlorine gas railcars to liquid bleach in 2001. Construction cost $1.3 million, and chemical costs increased from 2002 to 2006 about $1.5 million, as chlorine prices more than tripled. The wastewater system serves some 800,000 people. Discounting two-thirds of increased chemical costs for price change, and not accounting for any operating savings, annual conversion costs are still less than a dollar per person served.

- **The Back River Wastewater Treatment Facility in Baltimore, Md.,** switched from chlorine gas railcars to liquid bleach in 2004. Construction cost $2.6 million, and chemical costs increased from 2003 to 2008 about $2.4 million, during which time chlorine prices more than doubled. For this and other reasons the facility is planning further conversion to generating bleach on-site. The entire wastewater system serves 1.3 million people. Discounting one-half of increased chemical costs for price change, and not accounting for any operating savings, annual conversion costs are still less than a dollar per person served.

Conclusion and Recommendations

More than five years after 9/11 and despite many credible warnings, the U.S. government has yet to enact policies that seriously reduce unnecessary chemical hazards. The Center for American Progress surveyed water utilities that still use chlorine gas railcars to examine systematic shortcomings in current federal chemical security policies, and to encourage Congress to enact policies that swiftly and efficiently remove unnecessary chemical hazards.

The survey shows that many large water utilities have converted from chlorine gas railcars to safer and more secure alternatives. These conversions remove terrorist targets at the facilities and on the rails, and make millions of Americans safer and more secure. Facility operators are relieved when the gas is gone and often proud of helping to bring about the change.

The roughly three dozen water utilities that still receive chlorine gas railcars can also convert to safer alternatives, but many are not acting. At the same time, recently enacted interim chemical security legislation exempts water utilities, neglects transportation hazards, and ignores safer technologies. Millions of Americans remain unnecessarily at risk from a catastrophic chemical release.

To address this threat, Congress, the administration, and industry must make chemical security an urgent national priority, with the goal of transitioning to safer, more secure technologies. Specifically:

- Water utilities that still use railcars of chlorine gas or anhydrous sulfur dioxide should shift to safer and more secure treatment alternatives.
- Congress should require chemical facilities to review and use available, cost-effective technologies that significantly reduce or eliminate serious emergency chemical release hazards.
- Congress should target grants, loans, and other incentives to help water utilities convert from chlorine gas, including facilities that discontinued chlorine gas after September 11, 2001. Such assistance should not cover containment buildings and other physical security measures that are inherently incapable of protecting chlorine gas railcars at water utilities and in transit.

- The Department of Homeland Security should go back to Congress for full authority to safeguard chemical infrastructure and the public, with appropriate roles for other governmental agencies.
- Congress should require chemical facilities to account for transportation risks—including the possibility of a catastrophic chemical release—in developing security alternatives, assessments, and plans.
- Congress should require chemical facilities to involve appropriate employees when developing security alternatives, assessments, and plans.
- The Department of Homeland Security should develop methodologies to account for the impact of safer, more secure technologies on facility security, including the costs, avoided costs, and feasibility of alternatives.
- Manufacturers of liquid bleach should adopt production methods that do not require bulk transportation or storage of chlorine gas. Congress should require these facilities to carry sufficient liability insurance to cover a catastrophic chemical release.

These policy recommendations are reasonable and obtainable. They would impose only insignificant burdens on consumers, while delivering measurable improvements in safety and security. Indeed, many water utilities have already abandoned chlorine gas at affordable cost with effective results. Congress and the Department of Homeland Security have the responsibility to compel the swift conversion of the remaining water utilities that still receive chlorine gas by rail. The reasons to do so are self-evident in this report. Congress and DHS need only act.

A graffiti-covered rail tanker passes within blocks of the National Mall in Washington, D.C. (Jim Dougherty/Sierra Club)

Appendix A

WATER UTILITIES USING CHLORINE GAS RAILCARS

FACILITY NAME	CITY	STATE	FACILITY TYPE	APPROXIMATE FACILITY SIZE— MILLION GALLONS PER DAY (MGD)	CONVERSION STATUS	VULNERABILITY ZONE POPULATION*
Joseph Jensen Filtration Plant	Granada Hills	CA	Drinking water plant	750 MGD	Evaluating alternatives; no active plans to convert	1,700,000
F. E. Weymouth Water Treatment Plant	La Verne	CA	Drinking water plant	520 MGD	Evaluating alternatives; no active plans to convert	304,873
Los Angeles Aqueduct Filtration Plant	Sylmar	CA	Drinking water plant	600 MGD	Have looked at alternatives; no change forecast	290,000
Sacramento Regional Wastewater Treatment Plant	Elk Grove	CA	Wastewater plant	165 MGD	No apparent plans to convert	18,000**
San Jose/Santa Clara Water Pollution Control Plant	San Jose	CA	Wastewater plant	115 MGD	Evaluating alternatives including ultraviolet light; liquid bleach is available backup	245,000
City of Stockton Tertiary Treatment Plant	Stockton	CA	Wastewater plant	35 MGD	Occasionally using liquid bleach as backup; considering other alternatives including ultraviolet light	430,200
Metro Wastewater Reclamation District	Denver	CO	Wastewater plant	160 MGD	Switching to liquid bleach by end of 2007	925,000
Fiveash Water Treatment Plant	Fort Lauderdale	FL	Drinking water plant	70 MGD	Switching to generating bleach on-site or other alternative by about 2008	1,526,000
John E. Preston Water Treatment Plant	Hialeah	FL	Drinking water plant	86 MGD	Developing plans to convert, possibly to on-site bleach; conversion likely within a few years	1,893,169
Alexander Orr Water Treatment Plant	Miami	FL	Drinking water plant	175 MGD	Developing plans to convert, possibly to on-site bleach; conversion likely within a few years	1,643,691
Hillsborough River Water Treatment Plant-Tampa, FL	Tampa	FL	Drinking water plant	85 MGD	Alternatives under consideration; conversion not imminent or planned	508,760
City of Tampa-Howard F. Curren AWTP	Tampa	FL	Wastewater plant	96 MGD	Has studied feasibility; no specific plans to convert	1,042,000
Topeka Water Treatment Plant	Topeka	KS	Drinking water plant	22 MGD	No plans to convert	173,925
Crescent Hill Water Treatment Plant	Louisville	KY	Drinking water plant	100 MGD	Switching to generating bleach on-site by about 2008–2009	675,100
Carrollton Water Purification Plant	New Orleans	LA	Drinking water plant	120 MGD	Switching to liquid bleach, likely in 2007	892,320
East Bank Wastewater Treatment Plant	New Orleans	LA	Wastewater plant	108 MGD (pre-Katrina)	Planning to convert eventually; timeline uncertain given major capital needs post-Katrina	726,185
Detroit WWTP-Chlorination/ Dechlorination Facility	Detroit	MI	Wastewater plant	700 MGD	No plans to convert	2,100,000

* Vulnerability zone figures, submitted by facilities to EPA, indicate residential populations within range of a worst-case toxic chemical release. These figures are not forecasts of potential casualties

** This figure most likely significantly understates the facility's vulnerability zone population

Appendix A, continued

WATER UTILITIES USING CHLORINE GAS RAILCARS, CONTINUED

FACILITY NAME	CITY	STATE	FACILITY TYPE	APPROXIMATE FACILITY SIZE—MILLION GALLONS PER DAY (MGD)	CONVERSION STATUS	VULNERABILITY ZONE POPULATION*
St. Paul Regional Water Services-McCarron	Maplewood	MN	Drinking water plant	50 MGD	No plans to convert	1,300,000
Fridley Filter Plant	Minneapolis	MN	Drinking water plant	85 MGD	No plans to convert	337,000
Kansas City, Missouri Water Treatment Plant	Kansas City	MO	Drinking water plant	115 MGD	No plans to convert	720,000
Florence Water Treatment Plant	Omaha	NE	Drinking water plant	64 MGD	No plans to convert	390,000
North Charleston Sewer District WWTP Herbert Site	Charleston	SC	Wastewater plant	17 MGD	Switching to ultraviolet light, expected completion about summer 2007	365,213
Omohundro Water Treatment Plant	Nashville	TN	Drinking water plant	90 MGD	Evaluating options; no finalized plan to convert	973,663
Central Wastewater Treatment Plant	Nashville	TN	Wastewater plant	288 MGD	Evaluating options; no finalized plan to convert	965,468
O.N. Stevens Water Treatment Plant	Corpus Christi	TX	Drinking water plant	80 MGD	No plans to convert	360,000
Elm Fork Water Treatment Plant	Carrollton	TX	Drinking water plant	330 MGD	Evaluating alternatives; no specific plan to convert	790,000
Bachman Water Treatment Plant	Dallas	TX	Drinking water plant	150 MGD	Evaluating alternatives; no specific plan to convert	2,000,000
Eastside Water Treatment Plant	Sunnyvale	TX	Drinking water plant	440 MGD	Evaluating alternatives; no specific plan to convert	1,800,000
NTMWD Regional Water Treatment Plant	Wylie	TX	Drinking water plant	265 MGD	No plans to convert; evaluating options	137,517
Central Wastewater Treatment Plant	Dallas	TX	Wastewater plant	120 MGD	No plans to convert; preliminary cost analysis of alternatives	930,000
Central Regional Wastewater System	Grand Prairie	TX	Wastewater plant	150 MGD	No plans to convert	3,931,692
Rolling Hills Water Treatment Plant	Fort Worth	TX	Drinking water plant	100 MGD	Under review; investigating on-site generation of bleach	428,447
East Water Purification Plant	Houston	TX	Drinking water plant	225 MGD	No plans to convert; alternatives evaluation ongoing	1,300,000
Central Valley Water Reclamation Facility	Salt Lake City	UT	Wastewater plant	56 MGD	Evaluating options as part of facility upgrade	1,334,000
Hopewell Water Treatment Plant	Hopewell	VA	Drinking water plant	10 MGD	Currently under review; no apparent plans to convert	91,000
City of Richmond Water Purification Plant	Richmond	VA	Drinking water plant	132 MGD	Switching to liquid bleach; completing conversion early 2007	704,630
City of Richmond Wastewater Treatment Plant	Richmond	VA	Wastewater plant	60 MGD	Evaluating and testing alternatives; no clear timeline to convert	722,769

* Vulnerability zone figures, submitted by facilities to EPA, indicate residential populations within range of a worst-case toxic chemical release. These figures are not forecasts of potential casualties.

Appendix B

WATER UTILITIES NO LONGER USING CHLORINE GAS RAILCARS*

FACILITY NAME	CITY	STATE	FACILITY TYPE	APPROXIMATE FACILITY SIZE—MILLION GALLONS PER DAY (MGD)	CONVERSION STATUS	CONVERSION YEAR	FORMER VULNERABILITY ZONE POPULATION**
Joint Water Pollution Control Plant	Carson	CA	Wastewater plant	330 MGD	Switched to liquid bleach	2004	210,000
Blue Plains Wastewater Treatment Plant	Washington	DC	Wastewater plant	370 MGD	Switched to liquid bleach	2001	1,700,000
Buckman Water Reclamation Facility	Jacksonville	FL	Wastewater plant	41 MGD	Switched to ultraviolet light	2001	360,000
R. M. Clayton WRC	Atlanta	GA	Wastewater plant	80 MGD	Switched to ultraviolet light	2000	1,151,993
Fall Creek Water Treatment Plant	Indianapolis	IN	Drinking water plant	20 MGD	Switched to liquid bleach	2000	771,633
White River Water Treatment Plant	Indianapolis	IN	Drinking water plant	70 MGD	Switched to liquid bleach	2003	968,579
Water Pollution Control Plant	Fort Wayne	IN	Wastewater plant	50 MGD	Switched to liquid bleach	2006	330,000
Waste Water Treatment Plant, West	Owensboro	KY	Wastewater plant	8 MGD	Switched to liquid bleach	2001	90,000
Jefferson Parish East Bank WWTP	Harahan	LA	Wastewater plant	40 MGD (pre-Katrina)	Switched to liquid bleach	2003	790,000
Back River Wastewater Treatment Facility	Baltimore	MD	Wastewater plant	150 MGD	Switched to liquid bleach	2004	1,470,000
Wyandotte Wastewater Treatment Facility	Wyandotte	MI	Wastewater plant	45 MGD	Switched to ultraviolet light	2000	1,100,000
Metropolitan Wastewater Treatment Plant	St. Paul	MN	Wastewater plant	222 MGD	Switched to liquid bleach	2005	520,000
Western Lake Superior Sanitary District	Duluth	MN	Wastewater plant	43 MGD	Switched to liquid bleach	2006	128,293
Middlesex County Utilities Authority	Sayreville	NJ	Wastewater plant	120 MGD	Switched to liquid bleach	2001	10,740,000
Edward P. Decher Secondary Wastewater Trmt. Plant	Elizabeth	NJ	Wastewater plant	65 MGD	Switched to liquid bleach	2003	50,000
City of Niagara Falls Wastewater Treatment Plant	Niagara Falls	NY	Wastewater plant	32 MGD	Switched to liquid bleach	2003	1,100,000
Mill Creek WWTP	Cincinnati	OH	Wastewater plant	130 MGD	Switched to liquid bleach	2001	860,000
Nottingham Water Treatment Plant	Cleveland	OH	Drinking water plant	70 MGD	Switched to liquid bleach	2002	1,100,000
Baldwin Water Treatment Plant	Cleveland	OH	Drinking water plant	60 MGD	Switched to liquid bleach	2005	1,400,000
Akron Water Supply Plant	Kent	OH	Drinking water plant	38 MGD	Switched to liquid bleach	2004	411,356
Columbia Boulevard Wastewater Treatment Plant	Portland	OR	Wastewater plant	70 MGD	Switched to liquid bleach	2005	157,500
Southeast Water Pollution Control Plant	Philadelphia	PA	Wastewater plant	90 MGD	Switched to liquid bleach	2002	1,182,741
Northeast Water Pollution Control Plant	Philadelphia	PA	Wastewater plant	190 MGD	Switched to liquid bleach	2003	1,575,971
Samuel S. Baxter Water Treatment Plant	Philadelphia	PA	Drinking water plant	165 MGD	Switched to liquid bleach	2005	787,271
South Treatment Plant	Renton	WA	Wastewater plant	80 MGD	Switched to liquid bleach	2003	650,000

* Facility converted since 1999 and fully eliminated chlorine gas.

** Vulnerability zone figures, submitted by facilities to EPA, indicate residential populations within range of a worst-case toxic chemical release. These figures are not forecasts of potential casualties.

Appendix C

PRODUCERS OF CHLORINE GAS SHIPPED BY RAIL TO WATER UTILITIES

FACILITY NAME	CITY	STATE	FACILITY TYPE	VULNERABILITY ZONE POPULATION*
Olin Corp. McIntosh, Alabama Plant	McIntosh	AL	Chlorine producer	42,750
Occidental Chemical Corporation, Mobile Plant	Mobile	AL	Chlorine producer	334,000
Occidental Chemical Corp., Muscle Shoals Facility	Muscle Shoals	AL	Chlorine producer	115,282
Olin Corporation Augusta, Georgia Plant	Augusta	GA	Chlorine producer	440,000
Occidental Chemical (formerly Vulcan Chemicals)	Wichita	KS	Chlorine producer	500,831
Occidental Chemical Corporation Convent Plant	Convent	LA	Chlorine producer	250,000
Occidental Chemical (formerly Vulcan Chemicals)	Geismar	LA	Chlorine producer	490,000
Occidental Chemical Taft Plant	Hahnville	LA	Chlorine producer	830,000
Pioneer Americas LLC	St. Gabriel	LA	Chlorine producer	408,000
Pioneer Americas LLC	Henderson	NV	Chlorine producer	1,100,000
Olin Corporation-Niagara Falls, New York Plant	Niagara Falls	NY	Chlorine producer	998,200
Occidental Chemical Corporation-Niagara Plant	Niagara Falls	NY	Chlorine producer	1,100,000
Olin Chlor-Alkali, Charleston Plant	Charleston	TN	Chlorine producer	258,000
Occidental Chemical Corporation Ingleside Plant	Gregory	TX	Chlorine producer	362,031
Oxy Vinyls, LP-Battleground Chlor-Alkali Plant	La Porte	TX	Chlorine producer	2,300,000
PPG Industries, Inc., Natrium	New Martinsville	WV	Chlorine producer	97,585

* Vulnerability zone figures, submitted by facilities to EPA, indicate residential populations within range of a worst-case toxic chemical release. These figures are not forecasts of potential casualties

Appendix D: Methodology

After the Center for American Progress released survey findings last year that documented 284 facilities in diverse industries that have switched to less acutely hazardous chemicals or processes, we decided to conduct a follow-up survey of water utilities that receive rail shipments of chlorine gas. We undertook this survey for four primary reasons. First, 90-ton railcars of chlorine gas pose a distinct danger of a major chemical release. Second, large water utilities are typically located near major cities and thus endanger large numbers of people. Third, rail shipments of chlorine gas travel many miles through populated areas, putting even more people at risk. And finally, there are clear, readily available alternatives to chlorine gas, which means this vulnerability can be quickly addressed.

This survey shows where progress has been made, drawing attention to successful, cost-effective plant conversions, and where we still have security vulnerabilities, giving particular attention to rail vulnerabilities, which are too frequently left out of the chemical-security conversation.

The survey included drinking water or wastewater facilities that reported railcar amounts of chlorine gas under EPA's Risk Management Planning, or RMP, program at some time since the program began in June 1999. Several water utilities that discontinued chlorine gas railcars prior to 1999 were also surveyed. The survey consisted of telephone interviews and in some cases follow-up email communication.

For water utilities that still report chlorine gas in railcar amounts, the survey used unstructured questions about the facility's timeline and plans, if any, to convert to a safer and more secure disinfectant, as well as about facility size, population served, and potential obstacles to conversion. For facilities that had already switched or where conversion is underway, the survey also covered conversion costs. In some cases facility size and population figures are from facility Websites or EPA's Clean Watersheds Needs Survey.[34]

This survey report uses publicly available rail maps and population density figures to illustrate transportation concerns in shipping chlorine gas from manufacturing sites through distributors to water utilities. Chlorine production sites were identified through industry publications and EPA regulatory analysis documents covering the chlorine industry.[35] Given the complexity and variability of suppliers and railways, the survey report does not link suppliers, distributors, and water utilities over specific rail routes.

Acknowledgments

Paul Orum wrote this survey report and interviewed personnel at the facilities it covers. Mr. Orum previously authored "Preventing Toxic Terrorism: How Some Chemical Facilities are Removing Danger to American Communities," published by the Center for American Progress in April 2006. He is the former director of the Working Group on Community Right-to-Know and currently works as an independent consultant on chemical safety and security issues.

Reece Rushing, director of regulatory and information policy at the Center for American Progress, provided editorial oversight and assisted in preparing the report. P.J. Crowley, senior fellow and director of national defense and homeland security at the Center for American Progress, also provided input and guidance on the report.

The photo on the cover is courtesy of Jim Dougherty/Sierra Club. The author and the Center for American Progress also thank Carol Andress of Environmental Defense for providing helpful comments, and greatly appreciate the cooperation of survey respondents at water utilities across the country.

Endnotes

1 Summary population at risk figures used in this report factor in overlapping vulnerability zones.

2 Summary water treatment figures used in this report factor in overlapping service areas.

3 The survey did not attempt to identify facilities that converted from chlorine gas railcars to a less hazardous disinfectant prior to 1999, but noted several wastewater facilities that had done so—the Southwest Wastewater plant in Philadelphia, Pa., and the Southerly and Westerly plants in Cleveland, Ohio. In addition, the Dalecarlia water plant in Washington, D.C. eliminated chlorine gas railcars in the 1980s and is planning long-term conversion to a less hazardous disinfectant. The survey identified three additional facilities that eliminated rail shipments of chlorine gas since 1999, but that still use smaller containers while planning long-term conversion to a safer and more secure disinfectant—the 23rd Avenue wastewater plant in Phoenix, Ariz., and the Crown water plant and Morgan water plant in Cleveland, Ohio. Other water utilities in Wheeling, W.V., Erie, Pa., and St. Louis, Mo., eliminated chlorine railcars since 1999, but have no current plans to fully convert to a less hazardous disinfectant.

4 Two additional wastewater facilities, in San Jose and Stockton, Calif., occasionally use less hazardous liquid bleach as a backup disinfectant.

5 These dispersion distances are found in RMP*Comp, developed by the Computer Aided Management of Emergency Operations (CAMEO) team of the National Oceanic and Atmospheric Administration and the U.S. Environmental Protection Agency. The Chlorine Institute, Pamphlet 74, "Estimating the Area Affected by a Chlorine Release" (1998) states that a chlorine gas plume from a railcar can remain at 14.8 miles "immediately dangerous to life or health." This is the level from which a healthy person must escape within 30 minutes or risk irreversible harm or death.

6 Homeland Security Council and Department of Homeland Security, National Planning Scenario 8. Chemical Attack—Chlorine Tank Explosion (2005).

7 U.S. Naval Research Laboratory, Testimony of Dr. Jay Boris before the City Council of the District of Columbia, October 6, 2003.

8 U.S. Government Accountability Office, GAO-05-851, Passenger Rail Security. Enhanced Federal Leadership Needed to Prioritize and Guide Security Efforts (September 2005).

9 "Militants Using Chemical Bombs in Iraq," *The New York Times*, February 21, 2007.

10 International Brotherhood of Teamsters, High Alert: Workers Warn of Security Gaps on Nation's Railroads (Fall 2005).

11 Working Group on Community Right-to-Know, Chemical Plant Security Breaches in the News (February 2007).

12 "Terror on the Tracks," *Pittsburgh Tribune*, January 14, 2007.

13 The National Response Center is the federal point of contact for reporting oil and chemical spills. NRC does not verify spill reports, which may range from very small to large.

14 These entities include the Department of Homeland Security, Department of Justice, Government Accountability Office, Environmental Protection Agency, Agency for Toxic Substances and Disease Registry, Army Surgeon General, and Naval Research Laboratory, Brookings Institution, Rand Corporation, PACE International Union, Center for Strategic and International Studies, and numerous investigative news reports.

15 Department of Homeland Security Appropriations Act, 2007, Section 550.

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18 "Philip Perry and the Politics of Chemical Security," Art Levine, *Washington Monthly*, March 2007.

19 National Research Council, National Academy of Sciences, Terrorism and the Chemical Infrastructure. Protecting People and Reducing Vulnerabilities (May 2006).

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21 Paul Orum for the Center for American Progress, Preventing Toxic Terrorism. How Some Chemical Facilities are Removing Danger to American Communities (April 24, 2006)

22 Edward R. Hamberger, Association of American Railroads, Statement before the U.S. House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Railroads (June 13, 2006).

23 U.S. Government Accountability Office, GAO-06-390, Securing Wastewater Facilities: Utilities Have Made Important Upgrades but Further Improvements to Key System Components May be Limited by Costs and Other Constraints (March 2006)

24 Reported disinfection treatments for public water systems serving more than 100,000 people. U.S. Environmental Protection Agency, Safe Drinking Water Information System (January 2007)

25 Paul Orum for the Center for American Progress, Preventing Toxic Terrorism. How Some Chemical Facilities are Removing Danger to American Communities (April 24, 2006)

26 U.S. producers that can manufacture industrial sodium hypochlorite without bulk transportation or storage of chlorine gas include Odyssey Manufacturing (Tampa, Fla.), BleachTech (Seville, Ohio), and Kuehne Chemical (Delaware City, Del.). A leading manufacturer of equipment to produce sodium hypochlorite without bulk chlorine gas is Powell Fabrication and Manufacturing, marketed as UniChlor Technology

27 KIK Custom Products, letter to the Honorable Ed Markey, Member of Congress (July 26, 2006)

28 Chlorine Institute, Pamphlet 10, North American Chlor-Alkali Industry Plants and Production Data Report 2005 (August 2006).

29 The survey did not attempt to identify facilities that converted prior to 1999, but noted three additional wastewater facilities that had done so. These facilities are the Southwest Wastewater plant in Philadelphia, Pa., and the Southerly and Westerly plants in Cleveland, Ohio. In addition, the Dalecarlia water plant in Washington, D.C. eliminated chlorine gas railcars in the 1980s and is planning long-term conversion to a less hazardous disinfectant

30 Bill Johnstone for the Center for American Progress, New Strategies to Protect America: Terrorism and Mass Transit After London and Madrid (August 10, 2005)

31 "Akzo Takes Chlorine off the Rails; Relocating Output Addresses Transportation Concerns," Ian Young, *Chemical Week*, November 22, 2006.

32 Conversion cost information was not available or incomplete from other facilities covered by the survey.

33 Environmental Defense, Eliminating Hometown Hazards (2003).

34 Population served and facility flow information from EPA's Clean Watersheds Needs Survey is found at http://cfpub.epa.gov/cwns/populationP.cfm.

35 U.S. Environmental Protection Agency, Economic Analysis of Air Pollution Regulations: Chlorine Industry (August 2000), and Chlorine Institute, Pamphlet 10, North American Chlor-Alkali Industry Plants and Production Data Report 2005 (August 2006).

Center for American Progress

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UNITED STEELWORKERS

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UNITY AND STRENGTH FOR WORKERS

February 16, 2010

VIA FAX

United States Senate
Washington, D.C. 20510

Dear Senator:

On behalf of the United Steelworkers (USW) I would like to express our strong opposition to the recently introduced Continuing Chemical Facilities Anti-terrorism Security Act (S. 2996) by Senator Collins. S. 2996 would nullify all the work that has been done in the House to produce a compromised comprehensive chemical security bill (H.R. 2868) that provides much stronger protection than existing law.

Extending the existing and inadequate Chemical Facility Anti-Terrorism Standard (CFATS) for five additional years would jeopardize the hundreds of thousands of workers who stand on the frontlines, working skillfully and diligently to ensure the safety of our nation's chemical-related facilities.

U.S. chemical plants remain one of the sectors of America's infrastructure most vulnerable to terrorist attacks. This is reinforced by the fact that the Department of Homeland Security (DHS) has identified approximately 7,000 high-risk U.S. chemical facilities. Since September 11th, sobering warnings were unheeded regarding the vulnerability of U.S. chemical plants to terrorist attacks. Guns, guards and gates are not enough and only offer a false sense of security.

Eight years after the September 11th attacks, the House of Representatives approved the "Chemical Facility Anti-Terrorism Act of 2009," (H.R. 2868) on November 6, 2009. This is the first time either house of Congress has approved permanent and comprehensive chemical security legislation. The potential for loss of life and economic disruption from an attack on one of these plants is staggering and the need for Congressional action to address the preventable hazards these plants pose to millions of workers, firefighters, police officers, and residents in surrounding communities is long overdue.

United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union

Legislative Department, 1150 17th Street, N.W., Washington, D.C. 20036 • 202-778-4384 • 202-293-5308 (Fax)

www.usw.org

By working at chemical plants across the country, USW chemical workers are the primary stakeholders in plant security issues. Further, our workers' collective expertise is vital to improving safety and security for themselves and their communities.

Under H.R. 2868, facilities that handle chemicals would have to take action to reduce the consequences of a terrorist attack, such as using different chemicals or changing to safer processes for their operations--so-called inherently safer technology. Such improvements limit not only the desirability of sites as terrorist targets but also the consequences of such an attack. Further, safer technology improvements reduce overall day-to-day risks of an unintentional incident affecting the plant, its workers, the community, and the environment.

CFATS and S. 2996 are silent regarding the use of safer and more secure technologies. Under the current CFATS and the proposed legislation, the Department of Homeland Security (DHS) is prohibited from requiring any particular security measure. Not only is DHS prohibited from requiring safer technologies where they are appropriate, DHS is also prohibited from requiring a facility to fix a hole in a fence.

H.R. 2868 also would involve plant employees in the development of security plans and would provide protections for whistleblowers. Employees and their representatives should be active participants in the area of vulnerability assessments of the chemical facilities they work in. Who best knows the inner-trappings of the facility than those who actually do the work? From areas of emergency response and safety and health, to chemical location and process knowledge, our members are the first and last line of defense dealing with issues ranging from everyday plant operations to emergencies.

The existing Chemical Facility Anti-Terrorism Standard (CFATS), authorized through the end of FY 2010 and S.2996 is inadequate to protect workers and their communities. H.R. 2868 would improve upon the existing CFATS by:

- requiring all covered facilities to make plans for the use of technologies that reduce the potential consequences of an attack;

- authorizing the government to require implementation of such plans, where technically and economically feasible, at those facilities that present the greatest release risk;
- mandating employee training and participation in plant security, including in compliance inspections;

- allowing states to set more protective standards;
- allowing workers and communities to enforce protections through citizen suits against government agencies and by petitioning agencies for enforcement against individual facilities; and
- requiring the government to report on enforcement and compliance so the public can know the law is being implemented, while avoiding publication of the vulnerabilities of individual facilities.

We urge you not to co-sponsor or support the introduced Continuing Chemical Facilities Antiterrorism Security Act (S. 2996) and, instead, to insist that the Senate adopt much stronger protections similar to those passed by the House last year in the "Chemical and Water Security Act of 2009" (H.R. 2868).

Sincerely,

Holly R Hart

Holly R. Hart
Legislative Director

HRH:ctl

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Before the
Homeland Security and Government Affairs Committee
U.S. Senate
on

"CHEMICAL SECURITY: ASSESSING PROGRESS AND CHARTING A PATH FORWARD"

Testimony of:
Rick Hind, Legislative Director
Mae Stevens, Policy Analyst
Greenpeace

HOMELAND SECURITY REGULATIONS (CFATS) ARE WHOLLY INADEQUATE

COMPREHENSIVE LEGISLATION IS ESSENTIAL TO SECURITY

INHERENTLY SAFER TECHNOLGIES WILL ELIMINATE THE CATASTROPHIC CONSEQUENCES OF AN ATTACK

March 3, 2010

"There are other ways to reduce risk that need to be part of the equation. Specifically, by employing safer technologies, we can reduce the attractiveness of chemical plants as a target."
--- Senator Barack Obama, March 30, 2006

"It's time for the big chemical companies to do their part to help protect America. They should stop manufacturing dangerous chemicals when safer substitutes are available. And if they won't do it, Congress should do it for them..."
--- Association of American Railroads, February 27, 2008

CONVENTIONAL SECURITY IS NOT ENOUGH

The September 11th terrorist attacks successfully used our own infrastructure against us with tragic results. They also demonstrated that tight perimeter security, such as in the case of the Pentagon, is incapable of preventing such attacks. Should a chemical plant be targeted, a truck bomb, a small plane, helicopter or a high powered rifle would easily render the industry's current reliance on fence-line security totally useless. In fact, U.S. chemical facilities have been referred to by then Senator Obama on the Senate floor as ***"stationary weapons of mass destruction."***

The recent domestic terrorist attack on an Internal Revenue Service (IRS) office building in Austin is a sobering reminder of the nearly nine years of neglect following the 9/11 attacks. The vulnerability of U.S. chemical plants to terrorism and serious accidents such as the 1984 disaster in Bhopal, India and in 2008 in Institute, West Virgina have been widely recognized. The potential magnitude of these risks far surpasses the 9/11 attacks. Once released these chemicals and gases can remain dangerous for up to 14 miles in an urban area (20 miles in a rural area) and put the lives of millions of Americans at risk. A December 2009 Congressional Research Service analysis of Environmental Protection Agency (EPA) data identified 91 chemical facilities that each put 1,000,000 or more Americans at risk.

The nature of these risks meets any definition of a weapon of mass destruction. The manner in which people would be killed and injured is terrifying. Poison gases such as chlorine will literally melt the lungs of its victims causing them to drown in their own lung fluid (pulmonary edema). Survivors could be left with life long disorders.

Following the 9/11 attacks it was reported that 9/11 ringleader, Mohamed Atta, visited a Tennessee chemical plant asking lots of questions (December 16, 2001 Washington Post). In the first six months of 2007 at least five successful terrorist attacks in Iraq used relatively small (150 to 250 pound) cylinders of chlorine gas to kill dozens of people. As a result the Department of Homeland Security (DHS) began briefing local bomb squads and chemical plants across the country. (April 24, 2007 USA Today) In February and April of 2007 thefts of 150 pound cylinders of chlorine gas occurred in California prompting questions by members of this Committee to the DHS about their response to these thefts, any other thefts and plans to eliminate these vulnerabilities by using inherently safer technologies.

U.S. chemical facilities were not built or designed to defend against terrorist attacks. And predicting where an attack will take place is a fool's errand. No one predicted that Timothy McVeigh would attack the Federal Building in Oklahoma City in 1995, killing 168 innocent people.

On June 25, 2007, duPont Chairman Charles O. Holliday Jr. told the media that he worries most about a computer system failure or a security breach at one of the company's chemical plants around the world. "I feel very comfortable that we've taken all the reasonable steps, but obviously if someone wants to fly an airplane into a plant, it's very hard to guard against it," said Holliday.

Stephen Flynn, Senior Fellow in National Security Studies at the Council on Foreign Relations warned in his 2007 book, The Edge of Disaster, " "...While attacks on the electric grid, oil and gas facilities, major ports, and the food-supply system have the potential to create the greatest cascading economic effects, it is chemical facilities near urban population centers that have the potential to inflict the greatest casualties. Placing them at the top of the list of priorities is obvious...In most cases, chemical plants that threaten nearby populations can switch to less dangerous substances. This practice is known as "inherently safer technology," or IST...Without a strong mandate from the federal government, it's unrealistic to think they ever will. Yet voluntary compliance is the premise of the legislation Congress passed last fall [2006]; the new rules rest on the assumption that companies will now suddenly begin taking steps they have so far refused to contemplate."

The Result Could be Catastrophic:

--- In July, 2004, the Homeland Security Council estimated that an attack on a single chlorine facility could kill 17,500 people, severely injure an additional 10,000 and result in 100,000 hospitalizations and 70,000 evacuations.

--- In January, 2004, the U.S. Naval Research Laboratory testified before the Washington, D.C. City Council warning that 100,000 people could be killed or injured in the first 30 minutes of a catastrophic release of a tank car of chlorine or similar chemical within blocks of Capitol Hill. They further estimated that people could "die at rate of 100 per second."

--- In June, 2003 FBI specialist on weapons of mass destruction, Troy Morgan, in a speech at a chemical industry conference warned, "You've heard about sarin and other chemical weapons in the news. But it's far easier to attack a rail car full of toxic industrial chemicals than it is to compromise the security of a military base and obtain these materials."

THE CURRENT REGULATIONS ARE FATALLY FLAWED:

The best that can be said for the Department of Homeland Security (DHS) chemical security regulations, "Chemical Facilities Anti-Terrorism Standards" (CFATS) is that they represent an official recognition of the widespread vulnerability of U.S. chemical plants to terrorism. The new DHS rules are based on a 744 word "rider," Sec. 550 of the Homeland Security Appropriations Act 2007. Sec. 550 authorizes "interim" regulations that will expire on October 4, 2009. The Obama Administration subsequently asked for and received a subsequent extension until October 4, 2010 explicitly to allow Congress to enact comprehensive legislation that will "supersede" Sec. 550's regulations.

The DHS rules finalized on November 20, 2007 fail to provide adequate protection for the nation and communities living in the shadow of thousands of U.S. chemical plants.

Specifically, the interim chemical security law and DHS rules (CFATS):

--- Prohibit the DHS from requiring any "particular security measure" including safer technologies that can reduce or eliminate the magnitude of an attack at virtually any chemical facility. To satisfy the chemical lobby, this was added to Sec. 550 (a) to prevent the use of safer technologies as a security measure but it also undermines the effectiveness of the entire statute by undercutting the DHS to credibly require ANY "particular security measure."

--- Fail to ensure priority protection of the 3,400 to 4,391 facilities each of which put 1,000 or more people at risk according to the DHS estimates. The DHS reports that they now have approximately 6,023 facilities in one of the four risk tiers with 793 in risk tiers 1 and 2. This leave approximately 5,230 in the lower two tiers with risk profiles that likely put 1,000 or more people at risk. Furthermore, Sec. 550 gives the Secretary of the DHS full discretion in determining which facilities will be considered to "present high levels of security risk." Clearly more guidance is needed in prioritizing high-risk facilities.

--- Fail to protect approximately 2,400 U.S. water treatment plants as well as several other exempted categories. Approximately 73 water treatment plants each put 100,000 or more people at risk. This exemption, also in Sec. 550 (a), covers public water systems regulated by the Safe Drinking Water Act and the Federal Water Pollution Control Act. In June 2007 Secretary Chertoff spoke to water facilities operators warning them that even though they are exempt under the interim law they are "on the hook because you're going to have to do this yourselves because the consequences of ignoring risks...will be quite severe." Once again this gap needs to be closed with comprehensive legislation.

--- Fail to protect 400 to 600 facilities regulated under the Maritime Transportation Security Act of 2002 also exempted by Sec. 550 (a).

--- Fail to protect the public's right-to-know by asserting authority to classify previously public information as secret, including information used in civil or criminal enforcement actions. Sec. 550 (c) and resulting new DHS regulations overreach by going beyond protecting common sense security plans and vulnerabilities into undermining enforcement and covering up governmental incompetence or corporate liability.

--- Fail to require meaningful involvement of plant employees in developing Security Vulnerability Assessments and Site Security Plans. The DHS responded to comments saying "there is nothing in the rule that prohibits chemical facilities from involving employees in their security efforts." While we should be thankful for that, such a policy fails to tap the expertise of a workforce that is formally trained in chemical hazard protection, accident prevention and emergency response. Employees are the first line of defense and the eyes, ears and noses of chemical facilities. The failure to formally involve employees in developing vulnerability assessments and security plans is foolish from both a security and scarce resource perspective.

--- Fail to include whistleblower protections that would enhance enforcement. The DHS rules promise to set up an anonymous tip line but ignores the long history of whistleblowers who have exposed waste, fraud and abuse. In this case they could save thousands of lives.

--- Fail to enhance enforcement by allowing citizens to sue to enforce the law, while allowing companies liberal appeals procedures to challenge DHS orders and decisions. Sec. 550 (d) prevents anyone but the DHS from suing a plant owner or operator to enforce any provision of this law. Once again, the law is balanced in favor of protecting the rights of recalcitrant facilities and/or violators and leaving innocent citizens facing overriding lethal risks with no legal recourse.

--- Prohibit the public from knowing which facilities are regulated under CFATS, if they are in compliance. Both DHS and corporate credibility will be in jeopardy if communities cannot determine if local chemical plant that pose these risks are being made safe or if they are in violation or is resisting orders by the DHS. Nor will communities even have the peace of mind of knowing whether a plant has voluntarily converted to safer technologies and no longer poses a threat to their community.

S. 2996 is a Continuation of the Same Flawed Program:

On February 4th Senator Collins (R-ME) introduced a bill (S. 2996) that would do nothing but extend this flawed law for five more years. We strongly oppose this bill and any further delay in comprehensive chemical security legislation.

Until now, Senator Collins has consistently said, on the Senate floor and in public statements, that the 2006 law (Section 550 which authorized CFATS) was "NOT" a comprehensive statute.

For a full copy of Senator Collins' floor statement, please visit:
http://thomas.gov/cgi-bin/query/D?r109:10:./temp/~r109SJf200::
For a copy of Senator Collins' press release, please visit:
http://hsgac.senate.gov/public/index.cfm?FuseAction=Press.MinorityNews&ContentRecord_id=d621b3f6-62c9-4b63-985d-6a41bbeb00e4&Region_id=&Issue_id=

She elaborated extensively on this point in her formal February 7, 2007 comments to the DHS on CFATS in which she criticized the Bush administration for suggesting that they could extend the temporary law without approval by Congress. Below are few examples of her comments DHS about the interim nature of CFATS and the intent of Congress to revisit comprehensive legislation:

"In drafting Section 550, the intent of Congress was clear and unambiguous – this statutory provision provides the Department strong, interim authority for up to three years until permanent, comprehensive authority can be enacted.

"Section 550 was a streamline version of chemical security legislation; it was not the comprehensive authorizing legislation that Congress intended to be the final authority on this matter.

"This period also provides Congress an opportunity to oversee implementation of the Department's interim program, to examine what works under the program and what can be improved, and to revisit the complex issue of chemical facility security within three years to enact more comprehensive authorizing legislation based on the Department's experiences.

"The Department does not have broad discretion to regulate beyond the interim three-year period without a comprehensive authorization from Congress. Any contrary interpretation of the 'sunset' provision is plainly wrong."

For a full copy of Senator Collins' formal comments, please visit:
http://www.greenpeace.org/usa/assets/binaries/collins-letter

We agree with Senator Collins 2006 and 2007 statements that CFATS is "NOT" comprehensive and that the "interim" law was passed to give Congress time to enact comprehensive legislation. However, merely adopting an extension of the current law, as Senator Collins suggests with the introduction of S. 2996, without incorporating lessons learned and new authorities that DHS is requesting, as the House passed bill (H.R. 2868) does, would in no way be comprehensive or responsible legislation.

The interim law has already been extended for one year until October 4, 2010. It would be irresponsible to postpone action any longer on permanent, comprehensive legislation that would eliminate catastrophic risks and close the gap on thousands of exempted facilities such as ports and water treatment plants.

SMART SECURITY IS SAFER MANUFACTURING PROCESSES ELIMINATE THE CONSEQUENCES OF AN ATTACK AND THEY ARE IN WIDESPREAD USE

In February 2008, the CEO of Association of American Railroads said, ***"It's time for the big chemical companies to do their part to help protect America. They should stop manufacturing dangerous chemicals when safer substitutes are available. And if they won't do it, Congress should do it for them...."***

There are commercially available safer alternatives for virtually all of the poison gas or toxic-by-inhalation (TIH) substances that pose the greatest risks to hundreds of urban areas. The Center for American Progress (CAP) conducted an analysis of EPA's Risk Management Program data and identified 284 facilities that have converted since 1999. See full report at:
http://www.americanprogress.org/issues/2006/04/b681085_ct2556757.html

Examples of conversions from TIH chemicals and continuing threats include:

--- More than 550 water treatment facilities (including Washington, D.C.) converted to safer alternatives such as ultraviolet light, eliminating the use of **chlorine** and **sulfur dioxide** gas. At least 73 water treatment plants still threaten more than 100,000 people.

--- Ninety-eight petroleum refineries use safer alternatives to **hydrogen fluoride (HF)**. But 50 refineries still threaten millions of people with the use of HF.

--- At least 36 electric power plants use safer alternatives to **anhydrous ammonia** gas such as dry urea. But 166 power plants still use anhydrous ammonia gas each threatening an average of 21,506 people.

--- The Blue Plains sewage treatment plant (like more than 550 other water treatment plants all over the US) in Washington, D.C. halted its use of chlorine and switched to safer chemicals just eight weeks after the 9/11 attacks due to fears of another attack. The plant had seven rail cars of chlorine on sight following the 9/11 attacks. The conversion only cost approximately $0.50 per year for each water customer. In other words, by using safer technologies we can neutralize and eliminate targeting by terrorists and prevent catastrophic accidents as well at negligible costs.

--- In November 2009, the Clorox Company announced plans to convert all seven of its U.S. facilities. This conversion will eliminate Clorox's bulk use of chlorine gas and risks to more than 13 million people in nearby communities.

--- In December 2008 Dow Chemical and K2 Pure Solutions announced an agreement in which K2 Pure would supply Dow's Pittsburgh, California facility with small quantities of chlorine gas produced in just-in-time batches by K2 Pure, thus eliminating the risks associated with bulk on-site storage and transport of chlorine gas.

This CAP analysis shows that 87% of the converted facilities spent less than $1 million and one third expected to save money, particularly from reduced liability costs and reduced regulation compliance costs. Clearly these conversion costs pale in comparison to the cost of disaster response, relocating communities, defending against personal injury law suits or resolving environmental clean up liability or even conventional security costs.

While the CAP analysis also proves the feasibility of safer alternatives, CAP estimates that at this rate of conversion, without any new regulatory requirements, it will take 45 years to eliminate hazards that pose the highest risk to America's hometowns. A 2008 CAP analysis identified 300 chemical facilities that together put 110 Million Americans at risk. The DHS needs the authority to prioritize the conversion of the highest risk plants first.

A 2006 GAO report (GAO-06-150), Homeland Security DHS Is Taking Steps to Enhance Security at Chemical Facilities, But Additional Authority Is Needed, concluded, "Implementing inherently safer technologies potentially could lessen the consequences of a terrorist attack by reducing the chemical risks present at facilities, thereby making facilities less attractive targets."

A Government Accountability Office report (GAO-05-165) identified chlorine gas and 90-ton chlorine rail cars as "among the top five terrorist-related wastewater system vulnerabilities." Among the top three recommendations: "Replacing gaseous chemicals used in wastewater treatment with less hazardous alternatives." In addition, the largest majority of experts gave replacing these chlorine facilities the highest priority for federal funding.

The Benefits of Safer Technologies:

The use of safer technologies offers a more competitive and stable business plan with fewer regulations, potentially zero liability, sustainable profitability, better relationships with workers and neighboring communities and no threat of a catastrophic attack or accident. Specifically, the use of safer technologies will likely result in a facility no longer being subject to DHS's CFATS regulations.

Obviously, chemical facilities located on site at nuclear power plants, water treatment works, iconic facilities such as Disney World, Camp David, etc. also need to be considered for priority protection. However, using safer technologies as a countermeasure at these facilities will lessen the lethality that an attack on them would pose. Given DHS's finite resources and the late start the nation has in addressing chemical security it is urgent that we use safer technologies to mitigate the consequence of an attack. By doing so we eliminate risks, safeguard communities and save scarce money and resources to protect targets that cannot be so neutralized (airports, U.S. Capitol, etc.).

COMPREHENSIVE CHEMICAL SECURITY IS NEEDED

On June 21, 2006 then Senator Obama said, "But there is one thing we can all agree on: any chemical plant security legislation must be comprehensive and rational. It should balance the need to keep us safe with the need to continue producing chemical products that are essential to our economy. I believe the IST approach needs to be a part of rational comprehensive security legislation."

To truly protect employees and surrounding communities, a comprehensive law should:
1) Use "smart security" to prevent the catastrophic consequences of an attack by implementing cost-effective safer and more secure chemicals and processes at all of the highest risk facilities.
2) Include all categories of facilities such as port facilities and water treatment plants.
3) Involve plant employees in developing plant security programs, including participation in workplace inspections, and provide employees with both an appeals and a waiver procedure to protect against excessive background checks.
4) Allow citizen suits to enforce the law by chemical facilities and government agencies and require reporting measures that strengthen accountability.
5) Allow states to set more protective security standards.
6) Require collaboration between the DHS, EPA and other agencies to avoid regulatory redundancy or inconsistency.

To correct the flaws in the interim law and enact comprehensive legislation, we urge you to support companion legislation in the Senate to legislation passed in the House of Representatives on November 6, 2009, the "Chemical and Water Security Act of 2009" (H.R. 2868). H.R. 2868 is a compromise that builds seamlessly on CFATS. It maintains the DHS as the lead agency regulating privately owned chemical plants, including port facilities, and authorizes the EPA as the lead agency regulating publicly owned water and wastewater treatment facilities and provides funding for publicly owned water facilities to adopt the most protective security measures.

While H.R. 2868 exempts more than 90 percent of distributors of agricultural fertilizers, it also provides $3 million each year in compliance assistance grants to the very largest wholesalers. In addition it makes no changes to the indefinite exemption that the DHS has given to agricultural "end users." (e.g. all farms and growers) H.R. 2868 also requires the DHS to assess the regulatory impacts on small businesses.

In addition H.R. 2868:
--- Requires high risk facilities to "assess" safer chemical processes and conditionally

requires the highest risk plants that pose a catastrophic gas release scenario (approximately 107) to use safer chemical processes where feasible and commercially available and includes a technical appeals process to challenge DHS decisions;
--- Provides up to $100 million in the first year to assist privately owned plants to use safer and more secure processes, $125 million for drinking water facilities and an unspecified portion of $200 million for wastewater facilities to use safer more secure processes;
--- Involves plant employees in the development of security plans and provides protections for whistleblowers and limits background check abuses;
--- Preserves state's authority to establish stronger security standards;
--- Bars citizen suits against private facilities but allows suits against DHS to enforce non-discretionary duties.

Greenpeace believes H.R. 2868 is a valuable piece of compromise legislation, and looks forward to working with the members of this Committee and their staffs in passing legislation at least as strong.

Appendices:
A – March 2010 Blue-Green Coalition Letter
B – Clorox Press Release
C – History of Chemical Security Legislation
C – Q&A on Section 2111 of H.R. 2868 as passed by the House November 6, 2009
D – Biblio
E – December 11, 2009 RMP data update from CRS

Appendix A:

American Federation of State, County and Municipal Employees (AFSCME)
Communications Workers of America (CWA) – International Brotherhood of Teamsters
International Chemical Workers Union Council/UFCW – NJ Work Environment Council
Service Employees International Union (SEIU) – United Automobile Aerospace and
Agricultural Implement Workers of America (UAW) – United Steelworkers (USW)
Clean Water Action – Earthjustice – Environment America – Friends of the Earth
Greenpeace – League of Conservation Voters – OMB Watch – Physicians for Social
Responsibility – Sierra Club – U.S. Public Interest Research Group
Alaska Community Action on Toxics – Advocates for Environmental Human Rights
Beyond Pesticides – Breast Cancer Fund – Center for Health, Environment and Justice
Center for International Environmental Law – Citizens' Environmental Coalition – Clean
New York – Connecticut Coalition for Environmental Justice – Connecticut Council on
Occupational Safety and Health – Deep South Center for Environmental Justice – Ecology
Center – Empire State Consumer Project – Environmental Health Strategy Center
Environmental Justice Action Group of WNY – Galveston Houston Association for Smog
Prevention and Mothers for Clean Air (GHASP/MfCA) – Global Community Monitor – Green
Education and Legal Fund, Inc. – Maine People's Alliance – MDPIRG – Natural Resources
Council of Maine – Northwest Atlantic Marine Alliance – Oregon Toxics Alliance – Science
and Environmental Health Network – Urban Semilas
Kristen Breitweiser, 9/11 Widow

March 1, 2010

Dear Senator,

On November 6, 2009, the House of Representatives passed the *Chemical and Water Security Act of 2009* (H.R.2868) a comprehensive chemical security bill. The undersigned organizations supported this legislation and would like to work with you to pass even more protective legislation in the U.S. Senate this year before the interim law expires on October 4, 2010.

Chemical plants and other chemical facilities remain one of the most vulnerable sectors of America's infrastructure to terrorist attacks. The Department of Homeland Security (DHS) has identified approximately 6,023 "high-risk" U.S. chemical facilities. In 2004, the Homeland Security Council planning scenario projected that an attack on a chemical facility would kill 17,500 people and send an additional 100,000 people to the hospital. A December 2009 Congressional Research Service review of EPA data shows that 91 chemical facilities each put 1 million or more people at risk.

The current interim statute enacted as a rider to the 2007 Homeland Security appropriations bill temporarily authorized the Chemical Facility Anti-Terrorism Standards (CFATS) to give Congress time to enact comprehensive legislation. As a security program CFATS was only an interim first step. It fails to protect the millions of Americans at risk by eliminating preventable catastrophic hazards.

The interim statute:

a. Prohibits the DHS from requiring any specific "security measure" whatsoever.
b. Fails to develop the commonsense use of safer and more secure chemical processes that can cost-effectively eliminate catastrophic hazards posed by poison gas.
c. Explicitly exempts thousands of chemical and port facilities, including approximately 2,400 water treatment facilities and 400-600 port facilities.

d. Fails to involve knowledgeable employees in the development of vulnerability assessments and security plans, or protect employees from excessive background checks.
e. Denies the public the information needed to ensure an effective, accountable program.

On February 4th Senator Collins (R-ME) introduced a bill (S. 2996) that would do nothing but extend this flawed law for five more years. We strongly oppose this bill and any further delay in comprehensive chemical security legislation. In fact, Senator Collins' own comments to the DHS in 2007 were clear. She said, *"The Department does not have broad discretion to regulate beyond the interim three-year period without a comprehensive authorization from Congress. Any contrary interpretation of the 'sunset' provision is plainly wrong."*

In their October 1st testimony before the House, both the DHS and the EPA called for comprehensive legislation to include water treatment plants and port facilities as well as conditional requirements to use safer available chemical processes where feasible at the highest risk facilities.

To correct the flaws in the interim law and enact comprehensive legislation, we urge you to support companion legislation in the Senate to H.R. 2868. H.R. 2868 is a compromise that *builds seamlessly on CFATS*. It maintains the DHS as the lead agency regulating privately owned chemical plants, including port facilities, and authorizes the EPA as the lead agency regulating publicly owned water and wastewater treatment facilities and provides funding for publicly owned water facilities to adopt the most protective security measures.

While H.R. 2868 exempts more than 90 percent of distributors of agricultural fertilizers, it also provides $3 million each year in compliance assistance grants to the very largest wholesalers. In addition it makes no changes to the indefinite exemption that the DHS has given to agricultural "end users." (e.g. all farms and growers) H.R. 2868 also requires the DHS to assess the regulatory impacts on small businesses.

In addition H.R. 2868:

- Requires high risk facilities to "assess" safer chemical processes and conditionally requires the highest risk plants (approximately 107) to use safer chemical processes where feasible and commercially available and includes a technical appeals process to challenge DHS decisions;
- Provides up to $100 million in the first year to assist privately owned plants to use safer and more secure processes, $125 million for drinking water facilities and an unspecified portion of $200 million for wastewater facilities to use safer more secure processes;
- Involves plant employees in the development of security plans and provides protections for whistleblowers and limits back ground check abuses;
- Preserves state's authority to establish stronger security standards;
- Bars citizen suits against private facilities but allows suits against DHS to enforce non-discretionary duties.

Passing comprehensive legislation this year is vital to our national security. Since 1999, more than 500 facilities have used "smart security" to eliminate these risks to more than 40 million Americans. In a March 2006 floor statement, then Senator Obama said, "by employing safer technologies, we can reduce the attractiveness of chemical plants as a target...Each one of these methods reduces the danger that chemical plants pose to our communities and makes them less appealing targets for terrorists." In November 2009, the Clorox Company announced plans to convert all seven of its U.S. facilities to eliminate the bulk use of chlorine gas and inherent risks to nearby communities.

The Association of American Railroads issued a statement in 2008 saying, *"It's time for the big chemical companies to do their part to help protect America. They should stop manufacturing dangerous chemicals when safer substitutes are available. And if they won't do it, Congress should do it for them..."*

To truly protect employees and surrounding communities, a comprehensive law should:

1) Use "smart security" to prevent the catastrophic consequences of an attack by implementing cost-effective safer and more secure chemicals and processes at all of the highest risk facilities.
2) Include all categories of facilities such as port facilities and water treatment plants.
3) Involve plant employees in developing plant security programs, including participation in workplace inspections, and provide employees with both an appeals and a waiver procedure to protect against excessive background checks.
4) Allow citizen suits to enforce the law by chemical facilities and government agencies and require reporting measures that strengthen accountability.
5) Allow states to set more protective security standards.
6) Require collaboration between the DHS, EPA and other agencies to avoid regulatory redundancy or inconsistency.

We look forward to working with you and your staff on this urgently needed legislation.

Sincerely,

John Morawetz
International Chemical Workers Union Council/UFCW

Liz Hitchcock
U.S. Public Interest Research Group

Rick Hind
Greenpeace

Holly Hart
United Steelworkers (USW)

Brian Turnbaugh
OMB Watch

Kristen Welker-Hood
Physicians for Social Responsibility

Alan Reuther
United Automobile Aerospace and Agricultural Implement Workers of America (UAW)

Ed Hopkins
Sierra Club

Pam Miller
Alaska Community Action on Toxics

Nathalie Walker & Monique Harden
Advocates for Environmental Human Rights

Charles Loveless
American Federation of State, County and Municipal Employees (AFSCME)

Jay Feldman
Beyond Pesticides

Jeanne Rizzo, R.N.
Breast Cancer Fund

Lois Gibbs, Executive Director
Center for Health, Environment and Justice

Daryl Ditz
Center for International Environmental Law

Barbara Warren
Citizens' Environmental Coalition

Kathy Curtis
Clean New York

Lynn Thorp
Clean Water Action

Dave LaGrande
Communications Workers of America (CWA)

Mark A. Mitchell
Connecticut Coalition for Environmental Justice
Mike Fitts
Connecticut Council on Occupational Safety and Health

Dr. Beverly H. Wright
Deep South Center for Environmental Justice

Emily Enderle
Earthjustice

Tracey Easthope
Ecology Center

Judy Braiman
Empire State Consumer Project

Anna Aurilio
Environment America

Michael Belliveau
Environmental Health Strategy Center

Judith M. Anderson
Environmental Justice Action Group of WNY

Erich Pica
Friends of the Earth

Matthew S. Tejada
Galveston Houston Association for Smog Prevention and Mothers for Clean Air (GHASP/MfCA)

Denny Larson
Global Community Monitor

Mark A. Dunlea
Green Education and Legal Fund, Inc.

LaMont Byrd
International Brotherhood of Teamsters

Kristen Breitweiser
9/11 Widow

Tiernan Sittenfeld
League of Conservation Voters

Ryan Tipping-Spitz
Maine People's Alliance

Johanna E. Neuman
MDPIRG

Denny Larsen
National Bucket Brigade Coalition

Matt Prindiville
Natural Resources Council of Maine

Rick Engler
NJ Work Environment Council
Niaz Dorry
Northwest Atlantic Marine Alliance

Dona Hippert
Oregon Toxics Alliance

Ted Schettler
Science and Environmental Health Network

Bill Borwegen
Service Employees International Union (SEIU)

Miguel Luna
Urban Semilias

Appendix B:

The Clorox Company News Release

Clorox Announces Plans to Begin Transitioning U.S. Operations to High-Strength Bleach

OAKLAND, Calif., Nov. 2, 2009 – The Clorox Company (NYSE: CLX) today announced that it plans to modify manufacturing processes in its U.S. bleach operations. The initiative calls for Clorox to begin transitioning from chlorine to high-strength bleach as a raw material for making its namesake bleach.

"This decision was driven by our commitment to strengthen our operations and add another layer of security," said Chairman and CEO Don Knauss.

Clorox will start with its Fairfield, Calif., plant. The company expects to complete the transition there within six months, followed by a phased, multiyear transition for six additional plants.

"This process requires significant expertise, training, and changes in infrastructure and equipment," Knauss said. "Our plant-by-plant approach will also enable us to apply what we learn along the way, ensure supply availability, minimize business disruptions and help make sure the transition is undertaken in the most effective manner possible."

"Clorox leads our industry in safety and security," Knauss said. "Our bleach plant employees are experts at handling chlorine, and we're proud of the fact that we've used it responsibly for our entire 96-year history. Even so, we're pleased to begin implementing this process change to make our products using high-strength bleach."

The Clorox Company

The Clorox Company is a leading manufacturer and marketer of consumer products with fiscal year 2009 revenues of $5.5 billion. Clorox markets some of consumers' most trusted and recognized brand names, including its namesake bleach and cleaning products, Green Works® natural cleaners, Armor All® and STP® auto-care products, Fresh Step® and Scoop Away® cat litter, Kingsford® charcoal, Hidden Valley® and K C Masterpiece® dressings and sauces, Brita® water-filtration systems, Glad® bags, wraps and containers, and Burt's Bees® natural personal care products. With approximately 8,300 employees worldwide, the company manufactures products in more than two dozen countries and markets them in more than 100 countries. Clorox is committed to making a positive difference in the communities where its employees work and live. Founded in 1980, The Clorox Company Foundation has awarded cash grants totaling more than $77 million to nonprofit organizations, schools and colleges. In fiscal 2009 alone, the foundation awarded $3.6 million in cash grants, and Clorox made product donations valued at $7.8 million. For more information about Clorox, visit www.TheCloroxCompany.com.

Forward-looking statements

This press release contains forward-looking statements, including statements relating to completion and effectiveness of modifying bleach manufacturing processes in U.S. Bleach operations, ensuring supply availability, minimizing business disruption, strengthening operations, reducing potential supply chain constraints, complexity and risks, increasing security, the company's costs, including volatility and increases in raw materials costs such as high-strength bleach, the financial condition of our suppliers; risks related to the handling and/or transportation of hazardous substances, including but not limited to chlorine; and the ability of the company to successfully manage legal and regulatory matters. These forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those set forth herein, including the risks and uncertainties discussed under the caption "Risk Factors" and elsewhere in Clorox's Form 10-K or Form 10-Q most recently filed with the Securities and Exchange Commission. These forward-looking statements speak only as of the date hereof and investors are cautioned not to place undue reliance on any such statements. Clorox disclaims any intent or obligation to update these forward-looking statements.

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Appendix C:

Chronology of Legislation on Chemical Security

1999: Senator Frank Lautenberg (D-NJ) introduces S. 1470, The Chemical Security Act of 1999. In April 2000 he calls on Senator James Inhofe (R-OK) to hold hearings on the bill which was never adopted.

October 31, 2001: Senator Jon Corzine (D-NJ) introduces the "Chemical Security Act of 2001" (S. 1602), requiring chemical facilities to use safer available technologies where available to prevent catastrophic attacks.

May 16, 2002: An internal EPA briefing document entitled "Proposal for Chemical Security Legislation" says that new legislation is needed because security of industry cannot be assured under current law.

June 11, 2002: EPA proposes White House roll out of chemical security policy through new guidance and regulations saying, "EPA is not seeking legislation on chemical security at this time." Guidance was to be issued in July 2002 along with an inspection of 30 high-risk chemical facilities.

July 25, 2002: The Senate EPW Committee unanimously adopts a compromise version of Senator Jon Corzine's (D-NJ) bill (S. 1602) to require safer technologies or chemicals where available to prevent catastrophic attacks.

October 23, 2003: The Senate EPW Committee adopts a flawed bill (S. 994) on a close party-line vote. The bill has no enforceable provision to prevent catastrophic attacks by requiring safer technologies or chemicals and rubber stamps industry's voluntary programs and never makes it to the floor.

March 30, 2006: Senators Lautenberg (D-NJ), Obama (D-IL), Kerry (D-MA), Menendez (NJ), Durbin (D-IL), Biden (D-DE) introduces a broad chemical security bill (S. 2486) that requires safer technologies when feasible at chemical plants, protects state authority to adopt stronger protections, gives plant employees meaningful participation in security programs and ensures a role for the EPA in oversight of facilities.

May 18, 2006: Senators Biden (D-DE), Jeffords (I-VT) and Boxer (D-CA) introduce the Community Water Treatment Hazards Reduction Act of 2006 (S. 2855) which requires high risk water facilities to identify safer technologies to eliminate hazards posed by the use of chlorine gas. The bill also authorizes $125 million a year over five years in grants to the highest risk facilities for capital costs needed to convert plants to safer technologies, including ultra-violet light, ozone or bleach.

May 19, 2006: Senator Inhofe, chair of the Environment and Public Works Committee, schedules a Committee vote for May 23rd on his wastewater security bill (S. 2781). The bill will squander millions of dollars on outdated security measures instead of funding the elimination of hazards posed by chlorine gas through the use of safer technologies as recommended by a 2005 Government Accountability Office report.

June 14-15 2006: Senate Homeland Security and Governmental Affairs Committee votes out weak chemical security legislation (S. 2145). Senator Voinovich (R-OH) proposes 14 weakening amendments. A Voinovich amendment to preempt states is rejected by a 9 to 7 vote. A Lieberman (D-CT) amendment to add cost-effective safer technology requirements is rejected 11 to 5.

July 28, 2006: House Homeland Security Committee completes mark up of H.R. 5695. The Committee embraces a compromise requiring the use of safer technologies at high priority facilities offered by Representative Markey (D-MA). An amendment by Representative James Langevin (D-RI) improves the right of state and local governments to set stronger security standards but falls short of a similar provision in S. 2145.

September 25, 2006: In a rush to show voters they have done "something" the Conference Committee on DHS Appropriations approved a 740 word unenforceable 3 year chemical security amendment supported by the chemical industry.

October 4, 2006: President Bush signs temporary chemical security statute which will expire in October 3, 2009.

June 12, 2007: President Bush threatened to veto a Department of Homeland Security (DHS) spending bill. Among their objections was "strong" opposition to a chemical plant security provision that would have restored the authority of states to set stronger security standards at chemical plants than the federal government. The chemical industry began lobbying for federal preemption to overrule state authority in 2005 when New Jersey announced stronger chemical security regulations. The bill was vetoed and the provision was eliminated in the final DHS spending bill.

December 27, 2007: President Bush signs $500 billion omnibus spending that includes an amendment by Senator Lautenberg (D-NJ) to the DHS funding bill that will allow states to set more stringent security standards.

March 6, 2008: House Homeland Security Committee adopts H.R. 5577 which requires high risk facilities to use safer more secure technologies as long as they are feasible, cost effective and do not shift risks to other facilities.

June 15, 2009: Representatives Bennie Thompson, (D-MS), Henry Waxman (D-CA), Sheila Jackson-Lee (D-TX), Ed Markey (D-MA) introduced H.R. 2868 which is even stronger than H.R. 5577.

June 23, 2009: House Homeland Security Committee rejects the most crippling amendments but adopts several weakening amendments to H.R. 2868.

October 1, 2009: Homeland Security Department and EPA officials testified before House Subcommittee on Energy and Environment calling for legislation that conditionally requires the use of safer chemical processes at the highest risk chemical plants where feasible and cost-effective.

October 21, 2009: House Energy & Commerce Committee rejects crippling amendments and adopts a stronger version of H.R. 2868 on chemical plant security and also adopts H.R. 3258 on drinking water plant security. Both bills conditionally require the use of safer chemical processes at the highest risk plants where feasible and cost-effective.

November 6, 2009: In a vote of 230 to 193, the House of Representatives passed a compromise bill, the Chemical and Water Security Act (H.R. 2868), which conditionally requires the use of safer chemical processes at some of the highest risk facilities where feasible and cost-effective. The bill also puts the EPA in charge similar regulations over publicly owned water treatment facilities.

Appendix D:

Q&A on the Inherently Safer Technology (IST) & Citizen Suits Provisions In "The Chemical and Water Security Act of 2009" (H.R. 2868)

Does H.R. 2868 require ALL chemical facilities to adopt "methods to reduce the consequences (MRC) of a terrorist attack" or inherently safer technology (IST)?

No. This requirement is conditional and covers a narrow universe of approximately 107 facilities in the highest-risk tiers (1&2) that pose a risk of catastrophic "release" to densely populated areas. It will NOT cover facilities in tiers 1&2 that pose a risk only from chemical "theft."

The conditions for implementing safer methods and technologies are:
*** They must significantly reduce the risk of death or injury in a terrorist attack
*** They must not shift risks to another location
*** They must be technically feasible
*** They must not impair the plant's ability to do business at that location
*** Water treatment systems must also meet state and federal safe drinking water standards

Can facilities challenge the requirement to implement safer chemical technologies?

Yes. All facilities must conduct a feasibility assessment of their ability to utilize safer chemical technologies. For those facilities subject to conditional requirements to implement safer technologies in risk tiers 1 & 2 because they pose a catastrophic "release" risk to nearby communities, they will also submit a feasibility assessment. If the DHS disagrees with a facility's assessment that they are NOT subject to the implementation requirements, the facility has 120 days to appeal. In making a ruling on the appeal, the DHS must consult a wide range of experts and must include those expert opinions in their ruling.

Will H.R. 2868 burden farms and agricultural facilities?

No. In January of 2008 the Department of Homeland Security (DHS) indefinitely exempted all "end-users" of regulated chemicals used in agriculture, including family farms, ranches and other crop, feed or livestock facilities from Chemical Facility Anti-terrorism Standards (CFATS).[1] The new legislation does nothing to change DHS's regulatory deferral of these facilities. In the agricultural sector, only manufacturers of agricultural chemicals and large wholesalers remain in CFATS and only 7 of these facilities are in risk tiers 1 or 2. The rest are in tiers 3 and 4 and are only responsible for assessing safer chemical processes. In addition, Representatives Ross (D-AR) and Space (D-OH) added an amendment to H.R. 2868 that requires the DHS to provide assistance to agricultural chemical wholesalers, including technical assistance grants to conduct assessments of safer technologies. It also requires the DHS to assess potential impacts on the agriculture sector for complying with the new statute.

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[1] 73 FR 1640 (January 9, 2008).

Will this requirement hurt jobs or the economy?

No. Plants that invest in the safety and security of their infrastructure invest in American communities, reduce or eliminate their liability and regulatory costs, and improve workplace safety and long term job security. Major trade unions, such as the United Steelworkers, United Auto Workers, International Chemical Workers/UFCW, International Association of Fire Fighters, Teamsters, SEIU, AFSCME and Communication Workers of America support H.R. 2868.

Does H.R. 2868 allow citizens to sue private parties to enforce the law?

No. The compromise bill eliminates citizen enforcement suits against private parties. Only suits against government agencies except the Department of Defense are permitted. The bill does, however, allow for a citizen petition process that can trigger a government investigation into potential violations by a chemical facility.

Are water treatment facilities treated differently?

Yes. The EPA, not DHS, will have the lead authority in regulating drinking water AND waste facilities. Drinking water systems that serve more than 3,300 people are covered, smaller systems are exempt. Waste water systems serving approximately 25,000 or more people are covered. The States have the lead authority to require the use of safer chemical processes. Smaller water systems will also be eligible for technical assistance to conduct assessments of safer technologies. The highest risk systems will be eligible for assistance to implement safer technologies based on risk and need. The bill makes available $125 million a year for three years to assist implementation of safer technologies for drinking water systems and $200 million a year for waste water systems.

Can facilities save money by using safer and more secure chemical processes?

Yes, in some cases, and in other cases costs are manageable. Surveys by the Center for American Progress identified 284 facilities that switched to safer methods since 1999. They found that 87 percent spent less than $1 million, and one half reported spending less than $100,000 on the conversion. Additionally, 34% of facilities expected "*cost savings or improved profitability.*" Twenty large city water utilities adopted safer and more secure options at a maximum cost of $1.50 per customer per year – less than a bag of potato chips – and often much less. Washington, D.C. converted its sewage treatment plant within 90 days after the 9/11 attacks for less than $0.50 per water customer per year. H.R. 2868 provides up to $225 million and H.R. 3258 provides up to $375 million for assistance in implementing safer chemical processes over a three-year period.

Will requiring the use of safer chemical processes shift risks locally or nationally?

No. H.R. 2868 specifically prohibits requirements that shift these risks to other facilities in the U.S. or to facilities outside of the United States and prohibits EPA or states from requiring facilities to adopt changes that shift chemicals to interim storage off-site.

Does H.R. 2868 mandate the use of specific technologies or can facilities choose which safer and more secure technologies to use?

Each high-risk facility is free to choose the most appropriate "feasible" and cost-effective technology or process identified in the facility's own assessment.

Should government require safer design and technologies to be used in the private sector?

Yes. The Federal Aviation Administration (FAA) has required airplane security and safety standards for decades. The feasibility and cost-effectiveness are balanced against security and safety needs. After 9/11 all commercial airliners were required to harden cockpit doors and X-ray machines for airline baggage were installed at hundreds of airports.

Are safer design requirements appropriate for security legislation?

Yes. In 2006 the GAO (GAO-06-150), concluded that "Implementing inherently safer technologies potentially could lessen the consequences of a terrorist attack by reducing the chemical risks present at facilities, thereby making facilities less attractive targets." And a June 2006 National Academy of Sciences study endorsed safer technologies as "the most desirable solution to preventing chemical releases" from a terrorist attack.

In a February 27, 2008 statement the Association of American Railroads said, "It's time for the big chemical companies to do their part to help protect America. They should stop manufacturing dangerous chemicals when safer substitutes are available. And if they won't do it, Congress should do it for them in the Chemical Facility Anti-Terrorism Act 2008."

Can different types of chemical facilities use safer methods to reduce the consequences of risks at more than 6,000 regulated facilities?

Yes. Many types of facilities are among the 284 facilities that have already converted since 1999. Most facilities (89%) are "users" of chemicals rather than chemical makers. These plants can often switch to safer methods even faster than chemical makers.

Types of facilities that are *already using* safer and more secure technologies include bleach manufacturers, water utilities, petroleum refineries, paper mills, power plants, and diverse manufacturers of products that include soaps and detergents, fuel additives, and polyurethane foam.

Four substances account for 55 percent of the processes that pose a catastrophic risk to communities according to the EPA. These substances are chlorine, ammonia, hydrogen fluoride and sulfur dioxide. They are also among the hazards eliminated at 284 plants that have converted since 1999.

Appendix E:

Bibliography and Quotations

Amnesty International:

Clouds of Injustice: Bhopal Disaster 20 Years On
November 29, 2004
http://www.amnesty.org/en/library/asset/ASA20/015/2004/en/dom-ASA200152004en.html

"Ensuring public participation and transparency in decisions relating to the location, operational safety and waste disposal of industries using hazardous materials and technology is an essential step to heighten risk awareness and responsible behavior as well as to ensure better preparedness to prevent and deal with disasters like Bhopal." p.6

In the Bhopal disaster "At least half a million people had been exposed to the toxic fumes."
p.10

Argonne National Laboratory

A National Risk Assessment for Selected Hazardous Materials Transportation
December 2000
http://projects.battelle.org/trbhazmat/Presentations/TRB2001-002217.doc

"...Releases of toxic chemicals can kill and injure people located relatively far from the accident...As a result, failure to identify and evaluate opportunities to reduce the risks from these types of relatively rare accidents could ultimately lead to thousands of fatalities, injuries, and evacuations."

Association of American Railroads

February 27, 2008

"It's time for the big chemical companies to do their part to help protect America. They should stop manufacturing dangerous chemicals when safer substitutes are available. And if they won't do it, Congress should do it for them in the Chemical Facility Anti-Terrorism Act of 2008."

The Brookings Institute:

Protecting the American Homeland; A Preliminary Analysis
2003
http://www.brookings.edu/press/Books/2003/protectingtheamericanhomelandoneyearon.aspx

Brookings estimate that a "successful attack on [a]… chemical plant [could result in] 10,000 fatalities." This estimate is modest.
p.6

"Prevention must be the highest priority (since it stops all attacks, large and small)."
p.8

"In most cases, government intervention should take the form of mandates on the private sector rather than through direct subsidies or tax incentives."
p.10

"…Preventive measures are likely to be particularly effective because they tend to reduce overall levels of risk, rather than just shifting it from one target to another."
p.35-6

"Shipping by rail poses certain concerns… Chlorine, for example, a toxic chemical that can enhance the combustion of other substances, is often stored and shipped in 90-ton rail tank cars. A release of 90 tons of chlorine could affect populations up to 14 miles away"
p.46

"Security at many chemical facilities has not been sufficient, as demonstrated even before September 11 by environmentalists from Greenpeace."
p.47

Center for American Progress:

Chemical Security 101
November 2008
http://www.americanprogress.org/issues/2008/11/chemical_security.html

"The only certain way to protect our communities is to remove the possibility of a toxic gas release by converting facilities to safer, more secure alternative technologies. This report identifies opportunities for conversions at the 101 most dangerous facilities, each of which threaten roughly 1 million people or more in surrounding areas. The chemicals most often posing the greatest danger at the top 101 facilities are chlorine—almost always in railcars—followed by hydrofluoric acid and sulfur chemicals.
p.1

"One insurance study found that a major chlorine rail spill in an urban area could cause 10,200 fatalities and over $7 billion in damages."
p.6

Toxic Trains and the Terrorist Threat
April 2, 2007
http://www.americanprogress.org/issues/2007/04/chemical_security_report.html

"Cost was a frequently cited reason for not converting. But the survey found such conversions are affordable even at large facilities, costing no more than $1.50 per person served each year--or the price of a bag of potato chips."
p.2

"Put another way, a single day's expenditures on the war in Iraq could cover construction costs of converting the remaining U.S. water utilities off chlorine gas railcars."
p.2

"A comprehensive solution can only come from the federal level. In fact, judges in the ongoing litigation over rerouting in Washington, D.C., have encouraged the Bush administration to develop a national strategy to address the security and safety dangers involved in the manufacture, use, and transportation of chlorine gas and other hazardous chemicals."
p.2

"A RAND Corp. database of worldwide terrorist incidents recorded over 250 attacks against rail targets from 1995 to 2005. Insurgents in Iraq have recently targeted trucks carrying chlorine gas with several deliberate attacks."
p.5

"Some facilities, however, identified important savings in preventative maintenance, emergency planning, employee training, regulatory compliance, future site security, and other factors.
p.10

"After all, there is little reason to believe that current security practices would be able to withstand a well-executed attack by an armed intruder. Nor does enhanced physical security do anything to protect railcars in transit to the facility."
p.10

"...Recently enacted interim chemical security legislation exempts water utilities, neglects transportation hazards, and ignores safer technologies. Millions of Americans remain unnecessarily at risk from a catastrophic chemical release."
p.14

"To address this threat, Congress, the administration, and industry must make chemical security an urgent national priority, with the goal of transitioning to safer, more secure technologies."
p.14

Preventing Toxic Terrorism: How Some Chemical Facilities are Removing Danger to American Communities
April 2006
http://www.crtk.org/library_files/ChemicalSurvey.pdf

Of the 238 chemical facilities that have already transitioned to safer chemicals or technologies, "of respondents that provided cost estimates, roughly half reported spending less than $100,000 to switch to safer alternatives and few spend over $1 million."
p.3

"Facilities cut a variety of costs and regulatory burdens by switching to less hazardous chemicals or processes. These facilities need fewer physical security and safety measures and can better focus on producing valuable products and services"
p.3

"Unfortunately, more than four years after the 9/11 terrorist attacks, the White House and Congress have failed to act. Currently, no federal law or regulation requires hazardous chemical facilities to review or use readily available alternatives."
p.4

"Many chemical facilities have already taken this step thereby protecting millions of Americans. Millions more could be taken out of harm's way within a concerted national effort to convert other high-risk facilities to safer chemicals and processes."
p.4

"Numerous federal agencies and other observers have warned that terrorists could turn hazardous chemical facilities into improvised weapons of mass destruction. These agencies include the Department of Homeland Security, Department of Justice, Government Accountability Office, Environmental Protection Agency, Agency for Toxic Substances and Disease Registry, Army Surgeon General, and Naval Research Laboratory, among others."
p.6

"Some 284 respondents in 47 states reported they had switched to less acutely hazardous chemicals or processes or moved to safer locations. As a result, more than 38 million Americans no longer live under the threat of a harmful toxic gas release from these facilities."
p.7

"...Approximately 1,150 wastewater facilities and 1,700 drinking water plants remain in the RMP program for extremely hazardous chemicals, primarily chlorine gas."
p.10

"Ultraviolet light and other options such as ozone are more effective than chlorine against certain biological agents such as anthrax that could contaminate drinking water."
p.11

"Some 18 manufacturing facilities reported process changes that reduced the danger of an off-site gas release...These manufactures represent diverse industries and made an array of changes... Notably, the majority of these facilities reported neutral costs or anticipated cost savings from their changes."
p.12

"A catastrophic chemical release at just one of the nation's most dangerous facilities could kill, injure or sicken tens of thousands. Adopting less acutely hazardous chemicals or processes is the only *certain* way to protect the public from a toxic gas cloud."
p.20

"Many facilities achieved significant safety and security improvements... Nonetheless, many other facilities that could make similar improvements remain potential terrorist targets. Accordingly, the chemical industry and government should make conversion of high-hazard facilities to safer available technologies a national strategic priority."
p.20

Charles River Associates

"Assessment of the Economic Benefits of Chlor-Alkali Chemicals to the United States and Canadian Economies"
April 1993
http://yosemite.epa.gov/ee/epalib/eelib.nsf/73bc8d7fb6d3644385256a290076d16f/56978f7fc30046d3852566b70051f917!OpenDocument

"...Any situation where chlorine-dependent processes or chlorine-containing compounds create unacceptable health and environmental risks should be corrected."
p.1

"At some cost, alternatives exist for *all* uses of chlorine and chlorine-derived compounds."
p.5

Chemical and Engineering News

"Simply Safer," by Jeff Johnson
February 3, 2003
http://pubs.acs.org/cen/government/8105/8105gov1.html

"Coined 'inherently safer design' by British chemical engineer Trevor Kletz in the late 1970s, the concept seems simple: It is better to design processes that eliminate chemical plant hazards at the beginning than to engineer 'add-on' technologies later to try to control them."
p.1/9

"Kletz, who is retired after 38 years with ICI [Imperial Chemical Industries], puts it like this, 'The very best way to prevent an explosion is to simply replace the material that explodes with one that does not or at least keep the stock down so low that it hardly matters if it all leaks out.'"
p.1/9

The concept was seized upon during the terrorism debate as a hazard reduction solution with safety benefits..."
p.1/9

"In the end, the result [of ISTs] could be a new world of smaller and highly efficient chemical plants."
p. 4/9

"[Trevor] Kletz, [Dennis C.] Hendershot, and others with long time chemical industry experience say industry, academia, and government should do much more to encourage the spread of what may ultimately be the safest, cheapest way to make chemicals."
p. 4-5/9

"'In many companies, the gut reaction to an accident is to reroute procedures,' he [Kletz] says. 'They are starting at the wrong end of the hierarchy.'"
p. 9/9

"'There are far, far more opportunities for inherently safer designs than we are making use of today,'" Kletz adds."
p. 9/9

The Chlorine Institute:

Estimating the Area Affected by a Chlorine Release—Pamphlet 74
February 2006
http://www.chlorineinstitute.org/Bookstore/ProductDetail.cfm?ItemNumber=2303

"90-Ton Rail Tank Car

- Total mass release = 180,000 pounds
- 10 minute release
- 300 pounds/second steady rate release
- Release occurs on concrete surface
- Maximum downwind distance to 3ppm = 41.5 miles
- Maximum crosswind distance to 3ppm = 2.3 miles
- Maximum downwind distance to 20ppm = 14.8 miles
- Maximum crosswind distance to 20ppm =1.9 miles" "Even a 150 lb cylinder could be catastrophic for over 1.5 miles."

p.20

"Even a 150 lb cylinder could be catastrophic for over 1.5 miles"
p.20

Recommended Practices for Handling Chlorine Tank Cars—Pamphlet 66
December 4, 2007
http://www.chlorineinstitute.org/Bookstore/ProductDetail.cfm?ItemNumber=2247

"Tank cars for chlorine use are permitted by regulation to have a maximum capacity of 90 tons (81648 kg) of chlorine. Chlorine tank cars have 55, 85 or 90 ton capacities. Tanks may not be loaded with chlorine in excess of the load limit stenciled on the side of the car."
p.8

"The weight of chlorine must not exceed 90 tons... Gross rail load must not exceed 263,000 pounds."
p.21

Congressional Budget Office:

Homeland Security and the Private Sector
December 2004
https://www.cbo.gov/doc.cfm?index=6042

"The security of the chemical industry--which includes oil and gas production, processing, and transportation--was a concern before September 11, but after that date, the increased national threat... amplified the expected losses...that many people already deemed vulnerable...."
p.21

"...September 11 indicated that the scope of potential attacks is now larger."
p.21

"EPA reported in 2000 that nearly 15,000 facilities were handling at least one hazardous substance in a quantity greater than threshold limits..., a subset of a much larger number of businesses handling a 'significant' quantity."
p.22

"Much of the overall government effort for chemical safety occurs at the state and local level and is oriented toward emergency preparedness. The federal effort (as of Dec. 2004) includes worker-safety, environmental, and information programs that are intended to support local activities."
p.27

The CBO recommends: "Better informing the public on where dangerous chemicals are, either by regulation or through public/private partnerships to disseminate information."
p.27

Congressional Research Service

Chemical Facility Security
August 2, 2006
http://www.fas.org/sgp/crs/homesec/RL31530.pdf

“Facilities handling large amounts of potentially hazardous chemicals (i.e., chemical facilities) might be of interest to terrorists… [and] the risks may be increasing—with potentially severe consequences for human health and the environment. Available evidence indicates that many chemical facilities may lack adequate safeguards.”
Summary Page (first page)

“Congress might enact legislation to reduce risks, either by ‘hardening’ defenses against terrorists… or by requiring industries to consider use of safer chemicals, procedures, or processes.”
Summary Page (first page)

Council on Foreign Relations

America the Vulnerable: How Our Government is Failing to Protect Us from Terrorism
Stephen Flynn, Senior Fellow in National Security Studies
2004
http://www.foreignaffairs.org/20020101faessay6557/stephen-e-flynn/america-the-vulnerable.html

"Congress should reconsider Senator Corzine's proposed provision to end the use of some especially deadly chemicals at plants near high population areas."
p.121

CRO Corporate Responsibility Office

"Complex Chemistry"
by Abby Schultz
June/July 2007
http://www.thecro.com/node/510

"Heather Langsner, Director of Research at Innovest Strategic Value Advisors… says Dow is right to develop green chemistries, which she notes Dow's competitors have been doing. However, Langsner is concerned with Dow's reliance on chlorine based products, such as polyvinyl chloride (PVC)."
p.20

"Observers of the company question whether Dow will ever overcome its legacy as a maker of Dursban and Agent Orange, as well as the legacy it inherited when it bought Union Carbide Corp. in 2001 On Dec. 3, 1984 a leak of methyl isocyanate (MIC) from an agricultural pesticide plant in Bhopal, India—a company in which Union Carbide held just more than half the stock—killed several thousand people. It is estimated that another 15,000 to 20,000 more people have died of complications since then, and the region is still contaminated 23 years later."
p.18

Dupont Chairman Charles Holliday

Security tops DuPont chief's concerns
News Journal Washington Bureau
By Nicole Gaudiano
June 26, 2007 and July 25, 2007
http://seclists.org/isn/2007/Jun/0120.html

In a presentation on industry risks, Mr. Holliday told the National Press Club: "I feel very comfortable that we've taken all the reasonable steps, but obviously if someone wants to fly an airplane into a plant, it's very hard to guard against it."

Falkenrath, Richard, Deputy Homeland Security Adviser to President Bush

Statement before US Senate Committee on Homeland Security and Governmental Affairs,
January 26, 2005
http://www.brookings.edu/testimony/2005/0126defense_falkenrath.aspx

"Of all the various remaining civilian vulnerabilities in America today, one stands alone as uniquely deadly, pervasive and susceptible to terrorist attack: toxic- inhalation-hazard industrial chemicals."

Federal Register
December 28, 2006

Proposed Rules

"The key difference is that they may involve effects that are more severe than expected with accidental risk."
Vol. 71, No. 249, p.78317

The Gardian

"Chemical Infrastructure Security: Good News and Bad News"
By P. J. Crowley
2006
http://www.infragardconferences.com/thegardian/ChemicaclInfra.html

"But the security dilemma is that... facilities that manufacture or use the most hazardous chemicals... are not moving fast enough to adopt safer alternatives that have been proven to be effective and economical."
p.4

"Entities that use specific chemicals should be required to study inherently safer technology or other alternatives. This analysis should be conducted annually and made available to the public and investors through annual reports or corporate filings with the Securities and Exchange Commission."
p.8

International Joint Commission:

Seventh Biennial Report
February 7, 1997
http://www.ijc.org/php/publications/html/7bre.html

"Recommendations:
....7) the Parties, in consultation with industry and other affected interests, develop timetables to sunset the use of chlorine and chlorine-containing compounds as industrial feedstocks and that the means of reducing or eliminating other uses be examined."
p.54

Sixth Biennial Report
February 10, 1997
http://www.ijc.org/php/publications/html/6bre.html

"...In many cases, alternative production processes do exist... We know that when chlorine is used as a feedstock in a manufacturing process, one cannot necessarily predict or control which chlorinated organics will result, and in what quantity. Accordingly, the Commission concludes that the use of chlorine and its compounds should be avoided in the manufacturing process. We recognize that socio-economic and other consequences of banning the use of chlorine--and subsequent use of alternative chemicals or processes--must be considered in determining the timetable."
p.29

"The Commission also recognizes that certain other uses of chlorine are of special concern because of the overwhelming public health benefits from their use. Disinfection of drinking water and sewage (as well as production of certain pharmaceuticals) are uses for which public health has been protected and for which, it is claimed, there are limited or no alternatives. Yet, there is evidence that chlorinated organics are created in water treatment processes and that, in other parts of the world, alternative processes have long been in use. Again, the issue seems to be cost rather than technology."
p.29-30

K2 Pure Solutions
2007-2009
http://www.k2pure.com/

“Utilizing our new, Inherently Safe Technology (IST), K2 Pure produces exceptionally pure, high-quality bleach with nothing but water, inert salt and electricity in a vertically integrated process that eliminates the need to transport chlorine.”

Ketchum/Clorox

“Crisis Management Plan for the Clorox Company”
1991
http://www.sourcewatch.org/index.php?title=Clorox

“Defining a ‘crisis’ is less important than knowing one when you see one.”
p.33

National Research Council:
Terrorism and the Chemical Infrastructure; Protecting People and Reducing Vulnerabilities
2006
http://www.nap.edu/catalog.php?record_id=11597

"According to a 2004 U.S. Fire Administration survey, fewer than 16 percent of fire departments in this country have hazmat units."
p.53

National Journal

"Security Leak"
August 2, 2003
by Margaret Kriz

"'These chemical plants have a vulnerability which has a catastrophic characteristic... that could approximate the World Trade Center,' Rand Beers, a White House counter-terrorism adviser for 30 years, told *National Journal.*"
p.2477

"'EPA initially said that one of the things facilities ought to at least look at as part of a comprehensive vulnerability assessment is whether there are steps they can take to reduce hazards that are present at the site,' recalls a former EPA official."
p.2478

"'Chemical companies make dangerous things,' added Greg Lebedev, president of the American Chemistry Council, which represents 180 giants of the chemical manufacturing industry. 'Getting into the technology of what you make and how you make it is a subject for an environmental or technology context, not security. I don't want us to wander down an exotic path here.'"
p.2479

"Corzine describes that defeat and industry's continuing effort to water down his bill as 'a classic case of the special interest trumping the public interest.'"
p.2480

"But the battle continues over Corzine's desire to encourage industry to use inherently safer technology at the chemical facilities."
p.2480

"'The problem you have in an open society is that it's physically impossible to make any large industrial site terrorist-proof,' Barton said in an interview. 'If there are enough terrorists who are dedicated enough and equipped well enough, they're going to overwhelm everything that you put up short of some sort of Fort Knox—which doesn't make much sense, given the cost and the relatively remote possibility that any specific site is going to be targeted.'"
p.2481

National Security Advisor to the President

Richard Clarke *UPI*
August 31, 2005

"Clarke criticized the administration and the Republican-controlled Congress for not giving priority to pushing through legislation yet. 'Congress has diddled for three years on a Chemical Security Act.'"

New Jersey Work Environment Council

Safety and Security First: Protecting Our Jobs, Families, and Hometowns from Toxic Chemical Disasters
May 2006
http://inquirer.philly.com/pdfs/2006/safety.pdf

In the likely case of a terrorist attack, not to mention the "far more frequent and continuing 'routine' accidents, spills, fires, and explosions
p.16

New York City Comptroller

One Year Later: The Fiscal Impact of 9/11 On New York City
September 4, 2002
http://www.comptroller.nyc.gov/bureaus/bud/reports/impact-9-11-year-later.pdf

Palm Beach Post

"Hijacking Suspect Cased Targets, Experts Say Mohammed Atta Called a 'Little Bomb Walking Around"
by Joel Engelhardt
October, 2001
http://www.greenpeace.org/usa/assets/binaries/falkenrath-testimony

"On October 28, 2001, Danny Whitener reported Mohammed Atta's (terrorist involved in 9/11 attacks) interest in the status of a chemical storage facility—the Palm Beach Post: "According to Whitener the man asked 'So tell me about this factory I just flew over,' referring to a former copper processing plant nearby, with dozens of round steel tanks and flanked by towering smokestacks. At the time, hundreds of rail tanker cars were parked near the plant, Whitener said... 'He was just persistent about the chemical company,' Whitener said. 'I told him the tanks were empty. He came back and said 'Don't tell me that. What about all the... [rail] tanker cars?'"

Paper, Allied-Industrial, Chemical and Energy Workers International Union (PACE):

PACE International Union Survey: Workplace Incident Prevention and Response Since 9/11
October 2004
http://www.google.com/search?hl=en&client=firefox-a&rls=org.mozilla%3Aen-US%3Aofficial&hs=8f7&q=PACE+International+Union+Survey%3A+Workplace+Incident+Prevention+and+Response+Since+9%2F11+PACE&btnG=Search

"PACE-represented industries... [namely] chemical manufacturing... facilities may be targets. The communities surrounding these facilities are also at-risk."
p.ii

Of PACE workers surveyed at 133 high-risk chemical facilities...

"Less than half (44%) of the respondents indicated that their company's preventative actions, including security efforts, were effective (*...very effective, moderately effective, ...[or] slightly effective)* in reducing the vulnerabilities of their site to a catastrophic event caused by a **terrorist attack.** Over one-third (36%) were *neutral* about the effectiveness, and one-fifth (21%) said the actions were ineffective."
p.*v*

"When considering responding to an event caused by a **terrorist attack**, 44% of respondents who characterized their sites as *high* risk found their company's actions ineffective."
p.*vi*

"A strong majority of respondents reported no action had been initiated by the companies at their sites to involve the local union or hourly workers in company plans or actions to *prevent* or *respond* to a catastrophic event caused by a possible **terrorist attack**.... Involvement of the community regarding company plans or actions was even lower.
p.*vi*

"It is especially sobering for those who work at or live near refineries... chemical plants.

"On February 12, [2003, the DHS sounded] another alert... warning of possible 'conventional attacks against the U.S. nuclear/chemical-industrial infrastructure... Based on information, ...industrial chemical plants remain viable targets."
p.3

"This adds up to nearly 4,000 sites and tens of millions of people at risk.
p.4

Pittsburgh Tribune-Review

"Chemicals pose risks nationwide"
June 11, 2002
By Carl Prine

http://www.pittsburghlive.com/x/pittsburghtrib/news/specialreports/potentialfordisaster/s_69664.html

"A month-long probe by the Pittsburgh Tribune-Review into chemical plant security in Baltimore, Chicago and Houston found safeguards so lax that a potential terrorist can easily reach massive tanks of toxins that endanger millions of residents."

Risk Management Solutions, Inc.

http://www.rms.com/NewsPress/PR_042904_CasualtyStudy.asp

"The chlorine spill scenario results in 42,600 total casualties, over 10,000 of which are fatal. Insurance claims covering these casualties would exceed $7 billion."
p.56

"Explosions, transportation accidents, and chemical releases all pose a threat to people living, working, or traveling in the vicinity of the accident."
p.54

"Chlorine is one of many industrial agents that are harmful, yet used extensively in processing and transported in bulk. Chlorine gas is so deadly that it was used as a chemical weapon in the trenches of World War I."
p.56

Securities Exchange Commission

10K Report submitted by The Dow Chemical Company December 31, 2008
http://ccbn.tenkwizard.com/filing.php?repo=tenk&ipage=5477624&doc=1&total=&attach=ON&TK=DOW&CK=0000029915&FG=0&CK2=29915&FC=000000&BK=FFFFFF&SC=ON&TC=FFFFFF&TC1=FFFFFF&TC2=FFFFFF&LK=0000FF&AL=FF0000&VL=800080

"Local, state and federal governments have begun a regulatory process that could lead to new regulations impacting the security of chemical plant locations and the transportation of hazardous chemicals.

"Growing public and political attention has been placed on protecting critical infrastructure, including the chemical industry, from security threats. Terrorist attacks and natural disasters have increased concern regarding the security of chemical production and distribution. In addition, local, state and federal governments have begun a regulatory process that could lead to new regulations impacting the security of chemical plant locations and the transportation of hazardous chemicals, which could result in higher operating costs and interruptions in normal business operations."
p. 10

Teamsters Rail Conference:

High Alert: Workers Warn of Security Gaps on Nation's Railroads
September 2005

http://www.ble.org/pr/news/newsflash.asp?id=4185

"Engineers report that there's no distress code or signal... to alert authorities of a crisis, even as they pass through or work in rail yards close to schools, government buildings and densely populated areas."
p1

"In short, workers say, America's rail lines appear one step shy of disaster."
p1

"As Americans debate and examine the nation's post-9/11security... serious questions regarding the safety and security of the U.S. rail system remain unanswered and serious flaws go uncorrected--leaving the American public vulnerable."
p1

"...Hazardous materials, says the Department of Transportation, are potentially weapons of mass destruction, and as such, are likely targets for terrorism."
p1

"Fatigue was the focus of the NTSB investigation into the deadly June 28, 2004 train crash in Macdona... in which three people including a train conductor, died from a chlorine gas release."
p.6

"More than half the workers surveyed who saw running, unattended locomotives... said the trains were hauling hazardous materials--deadly agents like chlorine that, if released, could kill people as far as 15 miles away, according to the pamphlet 'Estimating the Area Affected by a Chlorine Release,' issued by the Chlorine Institute."
p.8

"The FBI's words were chilling: al Qaeda cells could be targeting trains carrying hazardous materials. The Bureau had captured al Qaeda photographs of railroad engines, cars and crossings, and officials said that terrorists could choose a number of strategies, 'such as destroying key rail bridges and sections of track to cause derailments or targeting hazardous material containers.'"
p.15

"Weapons of mass destruction, the workers knew, had become part of their daily lives."
p.16

"Nearly 85% of the world's chlorine... is shipped by rail, according to the International Labour Organization (ILO)."
p.16

"By the time the green, gaseous cloud had passed over Graniteville on January 6, 2005, nine people were dead... Thousands of people were evacuated from their homes. Hundreds were injured. The full extent of environmental damage is still unknown."
p.16-17

"...Since 9/11, the nation's rail carriers have, by virtually all accounts, failed to provide significant, measurable safety and security improvements to deter or respond to a

terrorist attack on the U.S. rail network."
p.18

"Restrict remote control use to non-hazmat shipments."
p.18

U.S. Army

Draft Medical NBC Hazard Analysis of Chemical-Biological-Radiological-Nuclear-High Explosive Threat, Possible Scenarios & Planning Requirements
By, **Army Office of the Surgeon General**
October 2006
http://www.fas.org/irp/doddir/dod/jp3_41.pdf

As summarized by the Washington Post (http://www.washingtonpost.com/ac2/wp-dyn/A10616-2002Mar11):

"A previously undisclosed study by the Army surgeon general concludes that as many as 2.4 million people could be killed or injured in a terrorist attack against a U.S. toxic chemical plant in a densely populated area."

U.S. Chemical Safety and Hazard Investigation Board

CSB Board Member John Bresland
February 28, 2007
http://www.chemsafety.gov/index.cfm?folder=news_releases&page=news&NEWS_ID=343

"Chlorine is a highly toxic substance that needs appropriate safeguards to prevent releases and protect the public, facility personnel, and emergency responders."

U.S. Environmental Protection Agency

Lessons Learned in the Aftermath of September 11, 2001
February 1, 2002

"General authority exists under the Safe Drinking Water Act (SDWA)/Clean Water Act (CWA) to perform vulnerability assessments, but EPA has only limited Authority to require corrective actions."
p.2-1

"Two specific incidents where security was a specific concern were identified: (1)railroads did not want to ship chlorine in tankers after attacks, but chlorine is needed to guarantee the safety of water supplies, and (2) EPA received requests to reroute chemical tankers and trucks away from the population centers."
p.D-14

Chemical Accident Risks in U.S. Industry
By James C. Belke
September 25, 2000
http://www.epa.gov/ceppo/pubs/stockholmpaper.pdf

"A chemical plant could effectively be converted into a weapon of mass destruction (WMD) relatively easily."
p.5
"Toxic chemicals... particularly ammonia and chlorine... account for the majority of RMP processes."
(with table)
p.13

"The median [negatively impacted] population for... toxic worst case scenarios is 1500 people."
p.25

"The high number of facilities in both class intervals is primarily due to the prevalent use of 90-ton rail tank cars for chlorine storage in the United States."
p.26

Letter from William H. Sanders III, Dr., P.H., P.E., Director, Office of Pollution Prevention and Toxics, to Rick Hind, Legislative Director of Greenpeace USA

"All chemical companies have a fundamental responsibility and a general duty to design, operate, and maintain a safe plant, prevent accidents, and to mitigate the consequences of those releases that do occur under section 112(r) of the Clean Air Act Amendments of 1990."

President Clinton's Clean Water Initiative
February 1994

"...The Administration will develop a national strategy for substituting, reducing, or prohibiting the use of chlorine and chlorinated compounds:

Within 6 months following enactment, the Administrator should convene a task force... to comprehensively assess the use, environmental and health impacts of chlorine and chlorinated compounds, and availability and relative efficacy and safety of substitutes for these substances as used in... solvents, PVC and other plastics..."
p.22

U.S. Government Accountability Office

Protection of Chemical and Water Infrastructure
March 2005
http://www.gao.gov/new.items/d05327.pdf

"In March, 2003, we recommended that Secretary of Homeland Security and the Administrator of EPA jointly develop, in consultation with the Office of Homeland Security a comprehensive national chemical security strategy to include... legislative

proposal to require chemical facilities to expeditiously assess their vulnerabilities... and... require these facilities to take corrective action."
p.6

"The nation's drinking water systems are not required to implement any risk reduction actions based on their vulnerability assessments."
p.7

"The majority of officials at the community water systems we visited reported that the federal government should provide technical support and guidance to help the water sector in developing and implementing security enhancements."
p.7

"The majority of officials we interviewed also supported the need for the federal government to expand financial support for the security enhancements in the water sector by providing funding designated for community water systems."
p.7

"According to a 1999 study by the Agency for Toxic Substances and Disease Registry (ATSDR), security at chemical plants in two communities was fair to poor." – ***General Accounting Office (GAO-03-439)***, March 2003

Homeland Security: DHS Is Taking Steps to Enhance Security at Chemical Facilities but Additional Authority Is Needed
January 27, 2006
http://www.gao.gov/products/GAO-06-150

"...Industry officials told us that they face a number of challenges in preparing facilities against a terrorist attack. They reported that the cost of security improvements can be a burden, particularly for smaller companies that may lack the resources larger chemical companies have to devote to security."
p.6

"Because chemical facilities pose significant risks to millions of Americans, additional legislation is needed to give DHS the authority to require security improvements at these facilities."
p.6

"...Stakeholders had mixed views, however, on the specific contents of any legislation, such as requirements that facilities substitute safer chemicals and processes--referred to as "inherently safer technologies"--that could lessen the potential consequences of an attack by reducing the risks present at these facilities, but could be costly or infeasible for some plants."
p.6

"We are also recommending that DHS... work with EPA to study the advantages and disadvantages of substituting safer chemicals and processes at some chemical facilities."
p.7

Homeland Security: Voluntary Initiatives Are Under Way at Chemical Facilities, but the Extent of Security Preparedness is Unknown
March 2003
http://www.gao.gov/new.items/d03439.pdf

"Chemical facilities may be attractive targets for terrorists intent on causing massive damage. The risk of an attack varies among facilities, depending upon several factors, including their location and the types of chemicals they use, store, or manufacture."
p.3

"Many facilities are located in populated areas, where a chemical release could result in injuries or death as well as economic harm."
p.3-4

"Furthermore, both the Secretary of Homeland Security and the Administrator of EPA have stated that voluntary efforts alone are not sufficient to assure the public of the industry's preparedness."
p.5

"The Army has also estimated the high potential damage to the population from a toxic gas release... The Army Office of The Surgeon General propose, based on generic estimates, that it was conceivable that as many as 2.4 million people could request medical treatment if a terrorist caused a release of a toxic chemical."
p.11

"ACC's security code generally requires that third parties... verify that [stated] improvements were implemented. The code does not require, however, that third parties verify that the vulnerability assessment is conducted appropriately or that the actions taken by the facility adequately address security risks."
p.26

"While industry recognizes the contribution that inherently safer technologies can make to reducing the risk of a terrorist attack, industry officials noted that decisions about inherently safer technologies require thorough analysis."
p.29

"Chemical facilities may be attractive targets for terrorists intent on causing economic harm and loss of life. Many facilities exist in populated areas where a chemical release could threaten thousands. EPA reports that 123 chemical facilities located throughout the nation have toxic 'worst-case' scenarios where more than a million people in the surrounding area could be at risk of exposure to a cloud of toxic gas if a release occurred."

U.S. Homeland Security Council:

Planning Scenarios: *Executive Summaries*
Scenario 8: Chemical Attack—Chlorine Tank Explosion
Copyright valid through 2009
http://www.globalsecurity.org/security/ops/hsc-scen-8.htm

"Assuming a high-density area, as many as 700,000 people may be in the actual downwind area, which could extend as far as 25 miles. Of these, 5% (35,000) will receive potentially lethal exposures... An additional 15% (105,000 people) will require hospitalization... However, approximately 450,000 "worried well" will seek treatment at local medical facilities.... Most of the injured will recover in 7 to 14 days, except for those with severe lung damage. These individuals will require long-term monitoring and treatment."
Section 8, p.2

"There will be significant damage to the plant as a direct result of the attack. Decontamination of waterways may present a significant challenge as well. Environmental impacts especially public safety concerns, are likely to significantly delay rebuilding efforts.
Section p.8-3

Casualties - 17,500 fatalities; 10,000 sever injuries; 100,000 hospitalizations
Infrastructure Damage - In immediate explosions areas, and metal corrosion in areas of heavy exposure
Evacuations/Displaced Persons - Up to 70,000 (self evacuate)
Contamination - Primarily at explosion site, and if waterways are impacted
Economic Impact - Millions of dollars
Potential for Multiple Events - Yes
Recovery Timeline - Weeks
Section 8, p.1

U.S. Justice Department: Federal Bureau of Investigation
Troy Morgan FBI Agent and expert on weapons of mass destruction
June 2003

"You've heard about sarin and other chemical weapons in the news. But it's far easier to attack a rail car full of toxic industrial chemicals than it is to compromise the security of a military base and obtain these materials."

U.S. Nuclear Regulatory Commission

Edward McGaffigan, Commissioner
November 2001

"There is no chemical regulatory commission that looks at the petrochemical plants and has requirements for security that are inspected by chemical regulatory agency staff, and there are no on-force exercises, and none of the apparatus that we have in place is in place for much of the rest of the infrastructure. It is quite clear that you can get catastrophic consequences in industries other than the nuclear industry..."

U.S. Naval Research Laboratory

Dr. Jay Boris, Testimony before the Committee on Pubic Works and the Environment of the Council of the District of Columbia
January 23, 2004
http://www.greenpeace.org/usa/assets/binaries/analysis-by-us-naval-research

"Terrorist attacks in an urban environment can put 100,000 people or more at risk in a 15 to 30-minute time span...lethally exposed people can die at the rate of 100 per second."

U.S. Public Interest Group Education Fund

Protecting Our Hometowns; Preventing Chemical Terrorism in America
2002
http://www.environmentillinois.org/uploads/vX/q5/vXq5bctEDIM08AzFaZHlxg/Protecting_our_Hometowns.pdf

"The threat of terrorism require eliminating or reducing hazards through the use of inherently safer technologies wherever feasible."
p.1

"The use of airplanes on September 11th and the use of truck bombs in previous attacks show that terrorists need not penetrate a site's perimeter to cause destruction, and security alone is inadequate to prevent a terrorist attack."
p.5

"While some attention has focused on the potential for terrorists to use chemicals to build chemical weapons, national security experts have asserted that the enormous complexity of creating a chemical weapon makes such a scenario less likely than an intentionally triggered chemical release from an industrial facility. Industrial facilities provide relatively easy access to chemicals at locations from which a significant chemical release could harm large numbers of people. Amy Smithson, director of the Chemical and Biological Weapons Non-Proliferation Project at the Henry L. Stimson Center, testified in a House of Representatives committee hearing:

'Although assembling from scratch an unconventional weapons capability that could cause mass casualties is not that elementary, there are tangible routes whereby terrorists could inflict considerable harm with chemical and biological substances. One

shortcut involves foul play with industrial chemicals.... Logic dictates that if the same result [mass casualties from a chemical release] can be achieved through a less arduous route, terrorists intent on causing mass casualties with chemicals would probably engineer the intentional release of industrial chemicals rather than wrestle with the complexities of making large quantities of the classic chemical warfare agents.'"
p.6

U.S. Senator (former), Garry Hart, D-CO

Washington Post, op-ed
August 11, 2003
http://www.washingtonpost.com/ac2/wp-dyn/A42185-2003Aug10?language=printer

"As hard as it is to believe, the chemical industry has refused to take adequate precautions to safeguard its facilities and surrounding communities. Some plants have strengthened on-site security by adding guards, building fences or installing surveillance cameras. Others have committed to reducing or phasing out their use of highly hazardous processes or chemicals in favor of safer ones. Unfortunately, however, it is still business as usual at most plants. They continue to deal with high volumes of dangerous chemicals -- even when safer materials or processes are readily available. That is why the government must require industry cooperation in homeland security."

U.S. Senator (former) Barack Obama, D-IL

Senate Floor Statement
March 30, 2006
http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?position=all&page=S2611&dbname=2006_record

"These plants are basically stationary weapons of mass destruction."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

"While plant owners would not be able to substitute their own security standards, they would be able to come up with security plans that are tailored to each facility."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

"The Lautenberg-Obama bill also protects state and local rights to establish security standards that match their local needs."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

"The legislation also gives employees a seat at the table..."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

"But there are other ways to reduce risk that need to be part of the equation. Specifically, by employing safer technologies, we can reduce the attractiveness of chemical plants as a target.
This concept, known as Inherently Safer Technology, involves methods such as changing the flow of chemical processes to avoid dangerous chemical byproducts,

reducing the pressures or temperatures of chemical reactions to minimize the risk of explosions, reducing inventories of dangerous chemicals and replacing dangerous chemicals with benign ones. Each of these methods reduces the danger that chemical plants pose to our communities and make them less appealing targets for terrorists."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

"Even the chemical industry itself has embraced IST, and many facilities across the country have already employed safer technologies."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

"So far, because the industry wields so much influence in Washington, it's been getting its way."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

"We cannot allow our security to be hijacked by corporate interests."
pS2612, CONGRESSIONAL RECORD—SENATE, *March 30, 2006*

Statement at Senate Environment and Public Works Committee hearing
June 21, 2006

"For instance, we've heard that IST is in "the early stages of development," even though it's been used in the chemical industry for nearly 30 years. Saying IST is in its infancy is a little like saying the personal computer is in its infancy."

"We've heard that IST is an environmental issue, not a security one, even though the Departments of Justice and Homeland Security, and even the American Chemistry Council have embraced IST as part of chemical plant security in the past. And most recently, a National Academy of Sciences study, commissioned by DHS, endorsed the adoption of IST as "the most desirable solution to preventing chemical releases" from terrorist attack. Time and again, experts have agreed that IST is the most effective approach to eliminating terrorist threats at chemical facilities."

"...But there is one thing we can all agree on: any chemical plant security legislation must be comprehensive and rational. It should balance the need to keep us safe with the need to continue producing chemical products that are essential to our economy. I believe the IST approach needs to be a part of rational comprehensive security legislation."

U.S. Senator (former), Warren Rudman, R-NH

CBS 60 Minutes
November 16, 2003
http://www.cbsnews.com/stories/2003/11/13/60minutes/main583528.shtml

"You know, the threat is just staring us in the face. I mean, all you'd have to do is to have a major chemical facility in a major metropolitan area go up and there'd be hell to pay politically," says Rudman. "People will say, 'Well, didn't we know that this existed?' Of course, we knew."

Washington Post

Study Assesses Risk of Attack on Chemical Plant

By Eric Pianin
March 12, 2002
http://www.highbeam.com/doc/1P2-326046.html

"A previously undisclosed study by the Army surgeon general concludes that as many as 2.4 million people could be killed or injured in a terrorist attack against a U.S. toxic chemical plant in a densely populated area."

Toxic Chemicals' Security Worries Officials

By Eric Pianin
November 12, 2001
http://www.mapcruzin.com/news/rtk111201a.htm

"'No one needed to convince us that we could be-and indeed would be-a target at some future date,' said Frederick L. Webber, president of the American Chemistry Council, an industry group representing 180 major companies including Dupont, Dow, and BP Chemical."

Working Group on Community Right-to-Know:

Unnecessary Dangers: Emergency Chemical Release Hazards at Power Plants

July 2004
http://www.crtk.org/library_files/PowerPlantsReport.pdf

"The data in this report also show that… just two-dozen power plants account for two-thirds of the people in danger. By using readily available safer chemicals these two-dozen plants could all but eliminate the danger to 2.4 million people."
p.3

"Some 166 power plants report using anhydrous ammonia, endangering an average of 21,506 people around each facility."
p.3

"Forty power plants report chlorine gas as their greatest emergency release hazard, endangering an average of 4,618 nearby residents."
p.3

"National data show frequent ammonia and chlorine spills at industrial facilities. The National Response Center received reports of… 2,200 releases involving chlorine gas. Spills reported… range from minor to very large."
p.6

"By switching to readily available and inherently safer pollution control options these power plants could eliminate or significantly reduce dangers that accidents or acts of terrorism pose to surrounding communities."
p.7

"Agencies that have issued such warnings include the Department of Homeland Security, Department of Justice, Environmental Protection Agency, General Accounting Office, Congressional Research Service, Agency for Toxic Substances an Disease Registry, Naval Research Laboratory, and Army Surgeon General." ... (list continues)
p.12

"The power industry should curtail unnecessary dangers by: converting high hazard power plants in populated areas to readily available safer alternatives to anhydrous ammonia and chlorine gas."
p.15

March 2, 2010

The Honorable Joseph Lieberman,
Chairman
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

The Honorable Susan Collins,
Ranking Member
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins:

The undersigned agri-business community organizations thank you for holding a hearing this week to examine the security of the United States' high-risk chemical facilities and to conduct oversight of the Chemical Facilities Anti-Terrorism Standards (CFATS) program administered by the Department of Homeland Security (DHS).

Homeland security and the protection of America's food supply is a top priority. The nation's agricultural industry continues to take pro-active steps to properly secure crops and livestock as well as critical crop input materials such as fertilizer and pesticides throughout the distribution chain. Our organizations and members are working closely with DHS to implement and ensure compliance with CFATS regulations. We encourage you to maintain the existing regulations and allow DHS to complete the first phase of their implementation. We support S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010."

S. 2996 would extend CFATS through October 2015 without making dramatic and costly interruptions to ongoing implementation efforts by business and government. We are pleased that the bill does not mandate government-selected security measures (e.g. inherently safer technologies (IST)) as part of the risk- and performance-based framework for protecting the nation's high-risk chemical facilities.
If an IST mandate were to be put in place for the nation's agricultural industry, it could jeopardize the availability of lower-cost sources of plant nutrient products or certain agricultural pesticides used by farmers and ranchers, as well as products which are used for specific agronomic reasons.

Any legislation considered by the Committee on Homeland Security, or on the Senate floor, needs to take into account the regulatory and economic impact on American agriculture and the consumer for whom we provide essential food, fiber and bioenergy. We look forward to working with both of you as the committee moves forward with legislation to address the nation's safeguards related to chemical security.

Sincerely,

American Farm Bureau Federation
Agricultural Retailers Association
Chemical Producers and Distributors Association CropLife America The Fertilizer Institute
National Agricultural Aviation Association National Corn Growers Association National
Council of Farmer Cooperatives USA Rice Federation

cc: Senate Committee on Homeland Security and Governmental Affairs

American Forest & Paper Association

March 2, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security
and Governmental Affairs
U.S. Senate
Washington, DC 20510

The Honorable Susan M. Collins
Ranking Member
Committee on Homeland Security
and Governmental Affairs
U.S. Senate
Washington, DC 20510

Dear Senators Lieberman and Collins:

On behalf of the U.S. forest products industry, we would like to thank you for your commitment to maintaining the security of the manufacturers and users of chemicals currently regulated by the Department of Homeland Security (DHS) under the Chemical Facilities Anti-Terrorism Standards (CFATS) program.

The American Forest & Paper Association is the national trade association of the forest products industry, representing pulp, paper, packaging and wood products manufacturers, and forest landowners. Our companies make products essential for everyday life from renewable and recyclable resources that sustain the environment. The forest products industry accounts for approximately 6 percent of the total U.S. manufacturing GDP, putting it on par with the automotive and chemical industries. Industry companies produce $200 billion in products annually and employ approximately 1 million people earning $54 billion in annual payroll. The industry is among the top 10 manufacturing sector employers in 48 states.

We share your concerns about the need to secure critical chemical facilities from terrorist attacks. The nation's forest products industry continues to take proactive steps to properly secure our facilities from the threat of potential terrorists. We have worked closely with DHS officials in order to establish appropriate standards and ensure compliance with CFATS regulations.

As the Committee on Homeland Security and Governmental Affairs reviews the CFATS program this week and considers future reauthorization, we would like to express our support for S. 2996, "The Continuing Chemical Facilities Anti-Terrorism Standards Act of 2010," which provides a clean extension of the program through October 2015. Through the bipartisan efforts of Senator Collins, Senator Pryor, Senator Landrieu and Senator Voinovich, the committee has a vehicle to allow industry to continue working with the DHS to implement the goals of CFATS and to avoid burdensome and costly provisions adding to uncertainty over the direction of the program; specifically proposals mandating implementation of Inherently Safer Technology (IST) and the elimination of

The Honorable Joseph I. Lieberman and
The Honorable Susan M. Collins
March 2, 2010
Page 2

the exemption for facilities currently covered by the Maritime Transportation Security Act.

S. 2996 will strengthen the collaborative efforts between our industry and DHS and we urge Senators to support the legislation.

Thank you for your consideration of our concerns and for all your efforts.

Sincerely,

Donna Harman

Donna A. Harman
President & CEO

AGA
American Gas Association

David N. Parker
President and CEO

March 2, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security and
Governmental Affairs
U.S. Senate
Washington, DC 20510

The Honorable Susan M. Collins
Ranking Member
Committee on Homeland Security and
Governmental Affairs
U.S. Senate
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins:

On behalf of the American Gas Association and its 195 member natural gas utility companies, I am writing to express support for S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010" (CFATS). The bill would extend CFATS through October 2015 without making dramatic and costly interruptions to ongoing implementation efforts by business and government. Importantly, S. 2996 does not mandate government-selected security measures (e.g., inherently safer technologies) as part of the risk- and performance-based framework for protecting the nation's high-risk chemical facilities from both physical and cyber threats. This is particularly important in light of the inclusion of underground storage of natural gas. A bill supporting flexibility is critical, so mandates written to apply to above-ground chemical facilities can be effectively adjusted for reasonable expectations of the different operations associated with underground natural gas storage facilities.

Natural gas is stored up to several thousand feet below the surface within geologic rock formations. In addition to the geologic depth of the storage facility, the areal extent of methane gas storage can range from hundreds of acres to nearly 100,000 acres. The surface properties underlain by the storage facilities have various, normally non-affiliated, surface owners with rights to utilize their property in many ways, including agriculture, forests, dwellings, and public roads, waterways and lands. Public roads, major interstates, major centers of transportation (airports), universities and commercial areas are common on the surface of the geologic footprint encompassed by natural gas storage fields. Thus, it is critically important that one-size-fits-all proposals meant for above ground facilities not be mandated for these facilities.

There are more than 70 million residential, commercial and industrial natural gas customers in the United States, of which 91 percent — more than 64 million customers — receive their gas from AGA members. Today, natural gas meets almost one-fourth of the United States' energy needs. Storage facilities play a significant role in ensuring these customers have reliable service.

As you know, CFATS will expire at the end of this fiscal year. CFATS is a new program within the context of homeland security that should be extended. S. 2996 will strengthen the collaborative relationship that the Department of Homeland Security and industry stakeholders have developed while creating and implementing CFATS, and the bill will give the owners and operators of high-risk chemical facilities the certainty they need to make long-term planning and investment decisions.

If you have any questions, concerns or comments, please do not hesitate to call Kyle Rogers, AGA's vice president of Public Affairs, at (202) 824-7218.

Sincerely,

David N. Parker

David N. Parker

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AGL Resources™

Jim Kibler
VP – Governmental Affairs
AGL Resources
Ten Peachtree Place
Atlanta, GA 30309

404 584 3256
www.aglresources.com

February 26, 2010

Senator Joe Lieberman
United States Senate
Washington, DC 20510

Senator Susan Collins
United States Senate
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins:

AGL Resources supports S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act, which reauthorizes the CFATS program through October 2015. CFATS is sensible legislation that allows the experts to secure their own facilities with competent, federal oversight.

AGL Resources owns and operates two underground natural gas storage facilities, and is committed both to the safety of its employees and the communities surrounding the facilities. CFATS has effectively crafted safety and security guidelines and goals that capitalize on expertise inherent and specific to each facility under its authority.

Initiatives which employ Inherently Safer Technologies (ISTs) seek to further secure industrial sites, but in fact could interfere with successful initiatives already in place, putting these facilities at greater risk. IST initiatives are ineffective due to the overgeneralization of processes and technologies unique to each facility. These policies do not capitalize on the expertise and experience of each business but instead nullify this important knowledge.

We ask you to support the Continuing Chemical Facilities Antiterrorism Security Act and allow the Department of Homeland Security sufficient time to fully implement the goals of the CFATS program.

Sincerely,

Jim Kibler

Cc: Senator Mark Pryor
Senator George Voinovich
Senator Mary Landrieu

Agrium

Agrium U.S. Inc.
7251 W. 4th Street
Greeley, CO 80634
Telephone: (970) 356-4400
Direct Line: (970) 347-1777
Facsimile: (970) 347-1560

Richard Gearheard
President Retail

February 25, 2010

The Honorable Susan Collins
Ranking Member
Homeland Security and
Government Affairs Committee
350 Dirksen Senate Office Building
Washington, D.C. 20510

Re: Continuing Chemical Facility Antiterrorism Security Act of 2010 (S. 2996)

Dear Senator Collins:

Thank you for introducing S. 2996, Continuing Chemical Facility Antiterrorism Act of 2010. This legislation will extend the Chemical Facilities Antiterrorism Standards (CFATS) program, a critical component of the nation's security.

S. 2996 will insure that the application and enforcement of CFATS can continue. The measure provides covered facilities appropriate time to implement security measures consistent with regulatory compliance.

Agrium operates production facilities throughout the United States and retail farm centers in nearly every state. The security of our sites and their products is one of our company's highest priorities. We have strong, cooperative partnerships with local, state and federal law enforcement agencies in these communities. The Department of Homeland Security has implemented this program in a very collaborative manner with our company. Agrium's security staff continues to work with these agencies to assess vulnerabilities and develop effective security plans. S. 2996 will maintain consistency in this work with the resources necessary to meet current performance standards.

We support your effort to continue the current CFATS program through S.2996 and we look forward to working with you to make this important bill become law.

Sincerely,

Richard Gearheard
Sr. Vice President

AOPL
Association of Oil Pipe Lines

1808 Eye Street, N.W.
Washington, D.C. 20006

Telephone (202) 408-7970
Fax (202) 280-1949

March 2, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security
and Government Affairs
340 Dirksen Senate Office Building
Washington, D.C. 20510

The Honorable Susan Collins
Ranking Member
Committee on Homeland Security
and Government Affairs
350 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Chairman Lieberman and Ranking Member Collins:

I write you today on behalf of the Association of Oil Pipe Lines (AOPL) in strong support of the Continuing Chemical Facilities Antiterrorism Security Act of 2010 (S.2996), recently introduced by Senators Susan Collins, Mark Pryor, George Voinovich, and Mary Landrieu.

AOPL is a nonprofit organization whose membership is comprised of owners and operators of liquid pipelines. Our members carry nearly 85 percent of the crude oil and refined petroleum products moved by pipelines in the United States. AOPL supports S.2996 because this bipartisan, common-sense legislation will continue the important implementation of the Chemical Facilities Anti-Terrorism Standards (CFATS) program at the Department of Homeland Security (DHS) without crippling and burdensome new regulations.

Our membership has long been concerned with the imposition of Inherently Safer Technology (IST) on crude oil and refined petroleum product pipeline and storage facilities in other legislative attempts before Congress. This misguided policy would direct limited DHS resources away from its key mission of protecting our nation from terrorism threats, and instead into operational and engineering decisions of specific companies. AOPL's member companies and operators comply faithfully and professionally with a host of safety regulations currently in place within the CFATS program. IST mandates would remove operational decisions away from those most qualified to make them – the trained employees of crude oil and refined petroleum product pipeline and storage facilities. AOPL commends S.2996 because it rightfully excludes unnecessary IST provisions and allows DHS to continue implementation of its safety standards.

As the Committee on Homeland Security and Government Affairs moves forward on its oversight of chemical facilities security, it is my hope that you will swiftly take action on this important legislation. We applaud the bipartisan and thoughtful work of Senators Collins, Pryor, Voinovich, and Landrieu. AOPL stands ready to work with you and the committee on this critical matter.

Sincerely,

Andrew J. Black

Andrew J. Black
President and CEO

AGRICULTURAL
RETAILERS
ASSOCIATION
Suppliers to America's Farmers

1156 15TH STREET, NW • SUITE 302 • WASHINGTON, DC 20005
T 202.457.0825 • F 202.457.0864 • *www.aradc.org*

March 1, 2010

The Honorable Susan Collins
Ranking Member
Homeland Security & Governmental Affairs Committee
United States Senate
344 Dirksen Senate Office Building
Washington, D.C. 20510

The Honorable Mark Pryor
Chairman
Homeland Security & Governmental Affairs Subcommittee
on State, Local and Private Sector Preparedness and Integration
United States Senate
613B Hart Senate Office Building
Washington, D.C. 20510

Dear Senators Collins and Pryor:

On behalf of members of the Agricultural Retailers Association (ARA)[1], I would like to thank you for introducing the "Continuing Chemical Facility Anti-terrorism Act of 2010" (S. 2996.). This legislation will reauthorize the U.S. Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (CFATS) rules for an additional five years. ARA and our members have been working closely with DHS officials to establish appropriate risk-based security standards and ensure compliance with the existing CFATS program. These rules are still being implemented by DHS as thousands of facilities are either waiting to receive their final tiering notification letter or obtain approval of their Site Security Plan (SSP).

S. 2996 will help ensure that regulated chemical facilities have certainty and regulatory consistency as they make economic and budgetary decisions regarding the implementation of security measures in compliance with the current CFATS program. The nation's agricultural retailers and distributors continue to take pro-active steps to properly secure critical crop input materials such as fertilizer and agricultural chemicals to prevent these products from getting in the hands of potential terrorists or other criminals.

ARA supports S. 2996 and encourages other Senators to co-sponsor and support this bi-partisan, common-sense legislation. Making extensive changes to the CFATS program now will only create greater economic uncertainty and lead to significant job losses, product losses, and facility closures in many rural communities.

Sincerely,

Richard D. Gupton

Richard Gupton
Vice President of Legislative Policy & Counsel

---

[1] ARA is a non-profit trade association representing the interests of agricultural retailers and distributors across the United States on legislative and regulatory issues. ARA members range in size from family-held businesses to farmer cooperatives to large companies with many outlet stores. Retail facilities are scattered throughout all 50 states and supply valuable goods and services to our nation's farmers including seed, crop protection chemicals, fertilizer, crop scouting, soil testing, custom application services and development of comprehensive nutrient management plans.

ATMOS
energy

February 26, 2010

The Honorable Mary L. Landrieu
United States Senate
328 Hart Senate Office Building
Washington, D.C. 20510

Re: Support for Continuing Chemical Facilities Antiterrorism Security Act of 2010

Dear Senator Landrieu:

We thank you for coauthoring with Senators Collins, Pryor and Voinovich the bipartisan Continuing Chemical Facilities Antiterrorism Security Act.

As the country's largest all-natural-gas distributor, Atmos Energy Corporation distributes natural gas to thousands of consumers and businesses in Louisiana, and it owns or contracts for 54 billion cubic feet of natural gas storage facilities subject to this act. We believe that reauthorizing the 2006 act's provisions relating to chemical facilities will help protect the public and prevent terrorism attacks on critical energy infrastructure.

Natural gas provides the superhighway to our nation's energy future. We appreciate your strong support for ensuring the reliability and safety of our country's natural gas supply.

Sincerely,

Robert W. Best
Robert W. Best
Chairman and Chief Executive Officer

Kim R. Cocklin
Kim R. Cocklin
President and Chief Operating Officer

Atmos Energy Corporation
PO Box 650205, Dallas, TX 75265-0205
P 972-934-9227 F 972-855-3797 atmosenergy.com

CenterPoint.
Energy

26 February, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

The Honorable Susan M. Collins
Ranking Member
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins:

CenterPoint Energy, Inc. is a utility holding company providing natural gas and electricity distribution services to over four million customers, and is the operator of two interstate natural gas pipelines and associated natural gas gathering facilities. CenterPoint Energy has a number of facilities subject to the Chemical Facility Anti-Terrorism Standards, "CFATS," authorized in 2006 under Section 550 of the Homeland Security Appropriation Act of 2007.

CenterPoint Energy strongly supports the legislation proposed by Senators Collins-Pryor-Voinovich-Landrieu, "Continuing Chemical Facilities Antiterrorism Act of 2010," reauthorizing the current law supporting the CFATS program through October 2015. We agree with the bi-partisan group of Senators sponsoring this bill, that the Department of Homeland Security has done a good job under the current law of creating a comprehensive chemical security program that has improved and continues to improve chemical plant security in the United States. DHS and industry should be allowed to continue their efforts under the current law.

CenterPoint Energy believes that it would be a mistake to make significant changes or additions to the existing CFATS scheme. In the House of Representatives, H.R. 2868, as proposed, would do just that, causing significant delay in achieving the overall goal of a more secure chemical industry in this country.

Although we strongly believe that S. 2996 is by far the more prudent approach, should the Committee have cause to consider H.R. 2868, CenterPoint Energy supports amending Title XXI, Sec. 2101(1)(a) of the Act by adding ", as appropriate" to the end of the sentence. We think this amendment is required to allow DHS the flexibility to deal with geographically extensive underground natural gas storage sites such as the storage sites we operate.

We urge the Committee to approve the Collins-Pryor-Voinovich-Landrieu bill as the best way to continue securing our country's chemical facilities against acts of terrorism.

Sincerely,

Bud Albright
Senior Vice President
Policy and Government Affairs
CenterPoint Energy

CHAMBER OF COMMERCE
OF THE
UNITED STATES OF AMERICA

R. BRUCE JOSTEN
EXECUTIVE VICE PRESIDENT
GOVERNMENT AFFAIRS

1615 H STREET, N.W.
WASHINGTON, D.C. 20062-2000
202/463-5310

March 2, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security and
Governmental Affairs
United States Senate
Washington, DC 20510

The Honorable Susan M. Collins
Ranking Member
Committee on Homeland Security and
Governmental Affairs
United States Senate
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins:

The U.S. Chamber of Commerce, the world's largest business federation representing the interests of more than three million businesses and organizations of every size, sector, and region, thanks you for holding a hearing this week to assess the security of the United States' high-risk chemical facilities and to conduct oversight of the Chemical Facilities Anti-Terrorism Standards (CFATS) program, administered by the Department of Homeland Security (DHS).

U.S. businesses that produce, use, or store chemicals add billions of dollars to the economy each year and employ hundreds of thousands of people nationwide. The Chamber supports S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010," a bipartisan bill crafted with the support of Senators Collins, Pryor, Landrieu, and Voinovich.

The bill would extend CFATS through October 2015 without making dramatic and costly interruptions to ongoing implementation efforts by business and government. The bill takes a bipartisan approach to regulating chemical security at approximately 6,000 facilities across the country. Importantly, S. 2996 does not mandate government-selected security measures (e.g., inherently safer technologies) as part of the risk- and performance-based framework for protecting the America's high-risk chemical facilities from both physical and cyber threats.

As you know, CFATS will expire at the end of this fiscal year. CFATS is both a new and positive program within the context of homeland security that should be extended. S. 2996 would strengthen the collaborative relationship that DHS and industry stakeholders have developed while creating and implementing CFATS; and the bill would give the owners and operators of high-risk chemical facilities the certainty they need to make long-term planning and investment decisions. The Chamber applauds your efforts to address America's chemical security and looks forward to continuing to work with Congress on this important issue.

Sincerely,

R. Bruce Josten

Cc: The Members of the United States Senate

Gary L. Sypolt
Chief Executive Officer
Dominion Energy

An operating segment of
Dominion Resources, Inc.
120 Tredegar Street. Richmond. VA 23219

Dominion

February 26, 2010

The Honorable Susan M. Collins
Ranking Member
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

Dear Senator Collins:

I write to offer Dominion's full support for the "Continuing Chemical Facilities Antiterrorism Security Act" and I applaud you for its introduction. Dominion is one of the nation's largest and most diverse energy companies, engaged in the production, transportation and distribution of electricity and natural gas and employing over 17,000 Americans.

Since the original Chemical Facility Security Antiterrorism Security Act (CFATS) was enacted by Congress in 2006, Dominion has worked diligently with the Department of Homeland Security to have our covered facilities assessed and tiered for purposes of putting in place appropriate security measures. That program is only now reaching full implementation stage. By largely leaving the current program intact, your bill would allow companies such as ours the certainty it needs to move ahead with the significant investments required under the law without the concern that it could be asked to tear up our plans and start over.

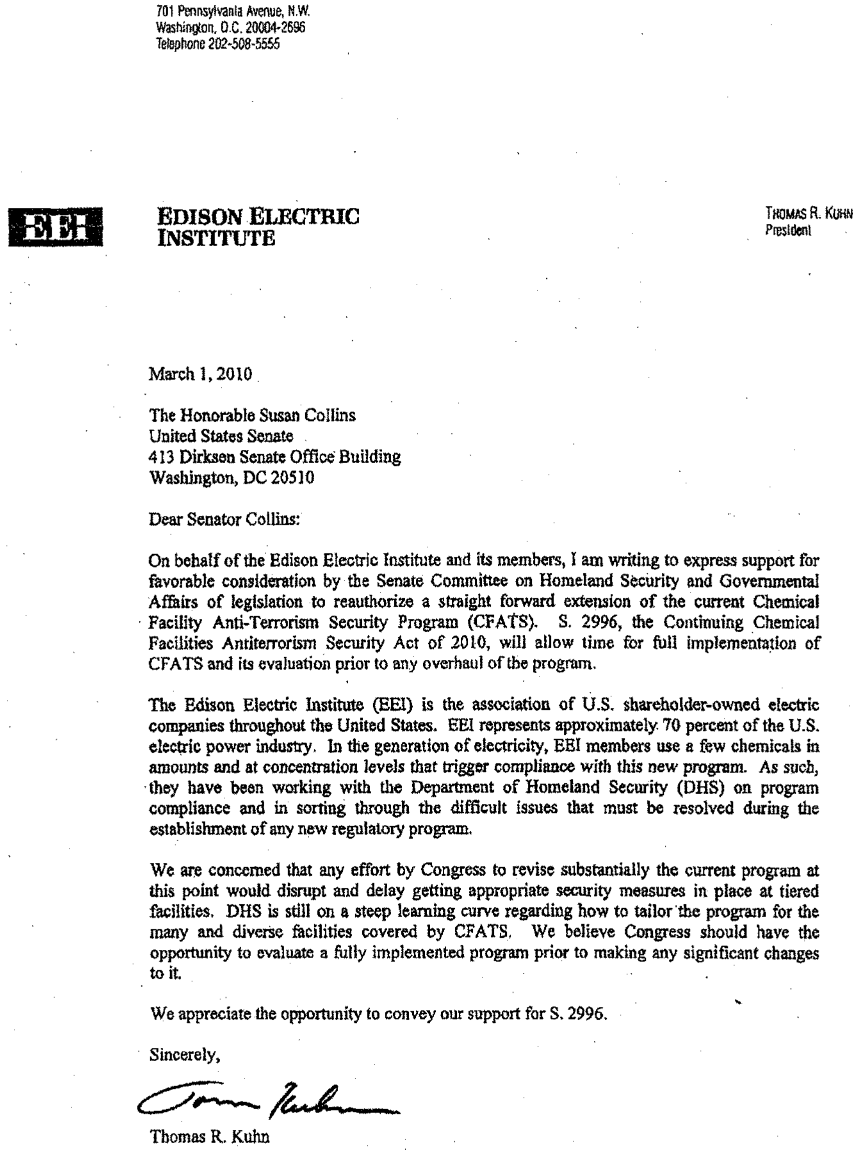
Accordingly, Dominion urges the swift enactment of this legislation.

Sincerely,

Gary L Sypolt

Gary L. Sypolt

cc: Senator Mary Landrieu
Senator Mark Pryor
Senator George Voinovich



701 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2696
Telephone 202-508-5555

EEI

**EDISON ELECTRIC
INSTITUTE**

THOMAS R. KUHN
President

March 1, 2010

The Honorable Susan Collins
United States Senate
413 Dirksen Senate Office Building
Washington, DC 20510

Dear Senator Collins:

On behalf of the Edison Electric Institute and its members, I am writing to express support for favorable consideration by the Senate Committee on Homeland Security and Governmental Affairs of legislation to reauthorize a straight forward extension of the current Chemical Facility Anti-Terrorism Security Program (CFATS). S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act of 2010, will allow time for full implementation of CFATS and its evaluation prior to any overhaul of the program.

The Edison Electric Institute (EEI) is the association of U.S. shareholder-owned electric companies throughout the United States. EEI represents approximately 70 percent of the U.S. electric power industry. In the generation of electricity, EEI members use a few chemicals in amounts and at concentration levels that trigger compliance with this new program. As such, they have been working with the Department of Homeland Security (DHS) on program compliance and in sorting through the difficult issues that must be resolved during the establishment of any new regulatory program.

We are concerned that any effort by Congress to revise substantially the current program at this point would disrupt and delay getting appropriate security measures in place at tiered facilities. DHS is still on a steep learning curve regarding how to tailor the program for the many and diverse facilities covered by CFATS. We believe Congress should have the opportunity to evaluate a fully implemented program prior to making any significant changes to it.

We appreciate the opportunity to convey our support for S. 2996.

Sincerely,

Thomas R. Kuhn

The Fertilizer Institute
Nourish, Replenish, Grow
Ford B. West
President

February 25, 2010

Senator Susan Collins
Ranking Member
Homeland Security and
Government Affairs Committee
350 Dirksen Senate Office Building
Washington, D.C. 20510

Re: *Continuing Chemical Facility Antiterrorism Security Act of 2010* (S. 2996)

Dear Senator Collins:

We would like to thank you for introducing S. 2996, *Continuing Chemical Facility Antiterrorism Act of 2010*. This legislation will continue the Chemical Facilities Antiterrorism Standards (CFATS) program, which is still in the process of being implemented. Your effort to continue this program will help to ensure that America's chemical facilities are as secure as possible, while allowing industry to work hand in hand with the Department of Homeland Security (DHS).

The Fertilizer Institute (TFI) represents fertilizer producers, wholesalers and retailers throughout the United States. Our products are critical to American agriculture, contribute to increasing productivity and yields, and are currently responsible for 40 to 60 percent of food production. Our industry places significant emphasis on the security of our products and has developed premier standards and systems in order to do so. The continuation of the CFATS program will foster further development of secure practices, while ensuring that American farmers have access to the valuable inputs they require.

We support your effort to continue the current CFATS program through S.2996 and we look forward to working with you to make this important bill become law.

Sincerely,

Ford B. West

Union Center Plaza
820 First Street, NE Suite 430
Washington, DC 20002

202.962.0490
202.962.0577 fax
www.tfi.org

IARW International Association of Refrigerated Warehouses

March 1, 2010

The Honorable Joseph Lieberman	The Honorable Susan Collins
Chairman	Ranking Member
Committee on Homeland Security and	Committee on Homeland Security and
Government Affairs	Government Affairs
340 Dirksen Senate Office Building	340 Dirksen Senate Office Building
Washington, D.C. 20510	Washington, D.C. 20510

Dear Chairman Lieberman and Ranking Member Collins:

As President and Chief Executive Officer of the International Association of Refrigerated Warehouses (IARW), I am writing to you in support of S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act of 2010. Many members of our association are currently participating in the Chemical Facilities Anti-Terrorism Standards (CFATS) program being administered by the Department of Homeland Security (DHS) and we believe that the approach taken in S. 2996 to authorize the program through 2015 is very appropriate. Much progress has been made during the first few years of the program and industry has enhanced the security of chemical facilities. Extending the current CFATS authority will give DHS the opportunity to continue its implementation of the program and not turn back on the progress already made.

S. 2996 also avoids the unnecessary provisions regarding inherently safer technologies (IST) included in chemical facility security legislation passed by the House of Representatives last year. These IST provisions would be detrimental to the progress of the existing CFATS program and should not be included in legislation. DHS should not be put in the position to make engineering or business decisions for chemical facilities around the country. It should be focused instead on making our country more secure and protecting American citizens from terrorist threats. Decisions on chemical substitutions or changes in processes should be made by qualified professionals whose job it is to ensure safety at facilities.

As you prepare for your hearing on chemical facility security on March 3rd, I strongly encourage you to consider the progress already made by the CFATS program and support an extension of authority as proposed in S. 2996. Please let me know if you have any questions about our experience with the CFATS program, or if I can be of any assistance.

Warm Regards,

J. William Hudson
President and CEO

International Association of Refrigerated Warehouses
1500 King St., Suite 201, Alexandria, Virginia 22314 USA
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International Institute of
Ammonia Refrigeration

A core partner of the Global Cold Chain Alliance

February 25, 2010

The Honorable Joseph Lieberman
Chairman
Committee on Homeland Security and
Government Affairs
340 Dirksen Senate Office Building
Washington, D.C. 20510

The Honorable Susan Collins
Ranking Member
Committee on Homeland Security and
Government Affairs
340 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Chairman Lieberman and Ranking Member Collins:

As President of the International Institute of Ammonia Refrigeration (IIAR), I am writing to you in support of S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act of 2010. Many members of our association are currently participating in the Chemical Facilities Anti-Terrorism Standards (CFATS) program being administered by the Department of Homeland Security (DHS) and we believe that the approach taken in S. 2996 to authorize the program through 2015 is very appropriate. Much progress has been made during the first few years of the program and industry has enhanced the security of chemical facilities. Extending the current CFATS authority will give DHS the opportunity to continue its implementation of the program and not turn back on the progress already made.

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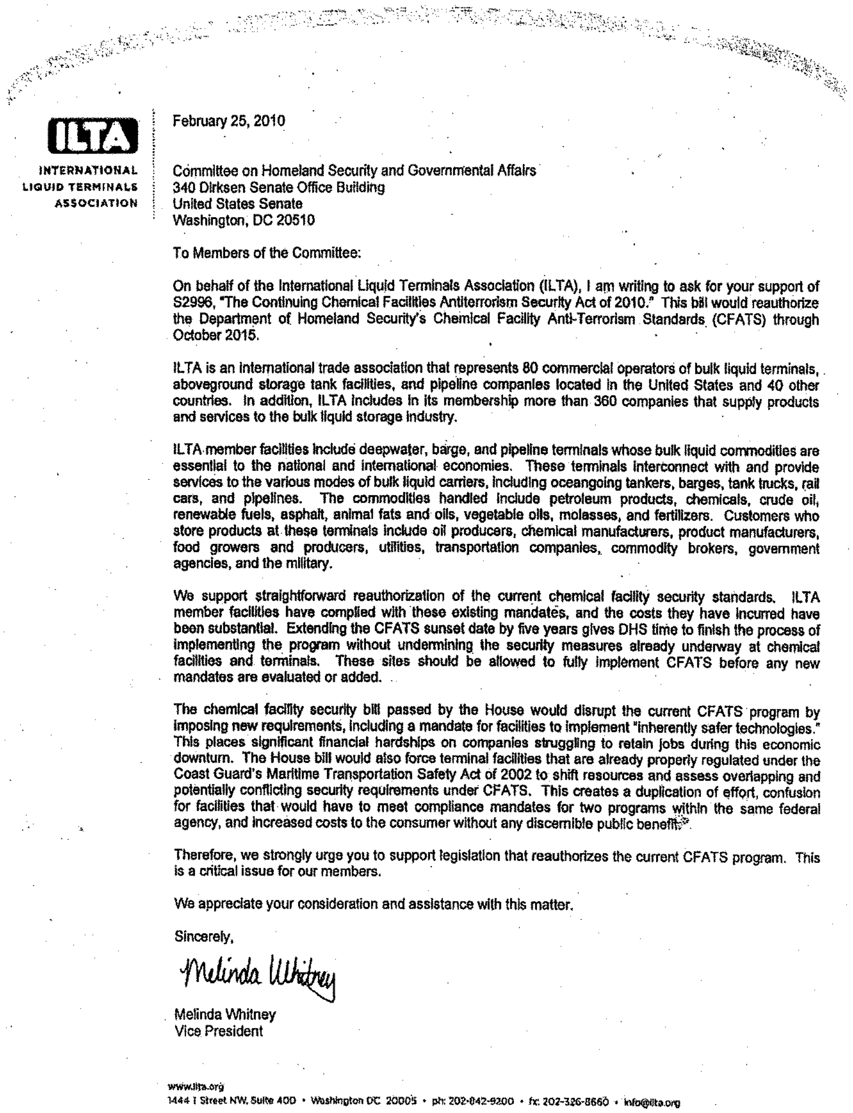
As you prepare for your hearing on chemical facility security on March 3rd, I strongly encourage you to consider the progress already made by the CFATS program and support an extension of authority as proposed in S. 2996. Please let me know if you have any questions about our experience with the CFATS program, or if I can be of any assistance.

Sincerely,

A. Bruce Badger

A Bruce Badger
President



ILTA
INTERNATIONAL
LIQUID TERMINALS
ASSOCIATION

February 25, 2010

Committee on Homeland Security and Governmental Affairs
340 Dirksen Senate Office Building
United States Senate
Washington, DC 20510

To Members of the Committee:

On behalf of the International Liquid Terminals Association (ILTA), I am writing to ask for your support of S2996, "The Continuing Chemical Facilities Antiterrorism Security Act of 2010." This bill would reauthorize the Department of Homeland Security's Chemical Facility Anti-Terrorism Standards (CFATS) through October 2015.

ILTA is an international trade association that represents 80 commercial operators of bulk liquid terminals, aboveground storage tank facilities, and pipeline companies located in the United States and 40 other countries. In addition, ILTA includes in its membership more than 360 companies that supply products and services to the bulk liquid storage industry.

ILTA member facilities include deepwater, barge, and pipeline terminals whose bulk liquid commodities are essential to the national and international economies. These terminals interconnect with and provide services to the various modes of bulk liquid carriers, including oceangoing tankers, barges, tank trucks, rail cars, and pipelines. The commodities handled include petroleum products, chemicals, crude oil, renewable fuels, asphalt, animal fats and oils, vegetable oils, molasses, and fertilizers. Customers who store products at these terminals include oil producers, chemical manufacturers, product manufacturers, food growers and producers, utilities, transportation companies, commodity brokers, government agencies, and the military.

We support straightforward reauthorization of the current chemical facility security standards. ILTA member facilities have complied with these existing mandates, and the costs they have incurred have been substantial. Extending the CFATS sunset date by five years gives DHS time to finish the process of implementing the program without undermining the security measures already underway at chemical facilities and terminals. These sites should be allowed to fully implement CFATS before any new mandates are evaluated or added.

The chemical facility security bill passed by the House would disrupt the current CFATS program by imposing new requirements, including a mandate for facilities to implement "inherently safer technologies." This places significant financial hardships on companies struggling to retain jobs during this economic downturn. The House bill would also force terminal facilities that are already properly regulated under the Coast Guard's Maritime Transportation Safety Act of 2002 to shift resources and assess overlapping and potentially conflicting security requirements under CFATS. This creates a duplication of effort, confusion for facilities that would have to meet compliance mandates for two programs within the same federal agency, and increased costs to the consumer without any discernible public benefit.

Therefore, we strongly urge you to support legislation that reauthorizes the current CFATS program. This is a critical issue for our members.

We appreciate your consideration and assistance with this matter.

Sincerely,

Melinda Whitney

Melinda Whitney
Vice President

www.ilta.org
1444 I Street NW, Suite 400 • Washington DC 20005 • ph: 202-842-9200 • fx: 202-326-8660 • info@ilta.org

IME
Institute of makers of explosives

The safety and security institute of the commercial explosives industry since 1913

February 25, 2010

The Honorable Susan M. Collins
United States Senate
Washington, DC 20510

Dear Senator Collins:

I am writing on behalf of the Institute of Makers of Explosives (IME)[1] and its members with operations in Maine to thank you for your sponsorship of S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010."

Commercial explosives rank as one of the most heavily regulated products in our society. The ability to manufacture, distribute and use these products safely and securely is critical to this industry, and to the economy. We have been heavily involved with the Department of Homeland Security's (DHS) Chemical Facility Anti-Terrorism Standards (CFATS) program. CFATS was authorized by Sec. 550, PL 109-295, as amended. Our industry is heavily invested in the implementation of CFATS. We understand that full stand up of the program is at least a year away.

At the same time, the CFATS program has now been temporarily extended on two occasions. The regulated community is anxious for a permanent authorization. We are concerned that legislation like H.R. 2868, which passed the House last year, would unacceptably and unnecessarily disrupt implementation to this program, given industry investments, the lack of actionable threat information against such facilities, and the current precarious state of the economy.

We hope that the upcoming hearing in the Senate Homeland Security and Governmental Affairs Committee entitled, "Chemical Security: Assessing Progress and Charting a Path Forward" will highlight the accomplishments to date of the CFATS program. We also hope that the hearing will provide a forum to show how CFATS and other federal security programs – including those of the US Coast Guard, the US Department of Transportation, Transportation Security Administration, and, in our case, the Bureau of Alcohol, Tobacco, Firearms and Explosives – as well as DHS' new efforts to regulate the commerce of ammonium nitrate, a precursor explosive material, are working together to ensure appropriate levels of security for the chemical sector.

Thank you again for your leadership on this important issue.

Respectfully,

Cynthia Hilton
Executive Vice President

---

[1] The IME is the safety and security association of the commercial explosives industry. The IME represents U.S. manufacturers and distributors of commercial explosive materials and oxidizers as well as companies providing related services. IME member companies produce over 98 percent of high explosives and a great majority of blasting agents and oxidizers. The United States relies on commercial explosives to build roads and other critical infrastructure, to mine coal and ore, obtain oil and gas, and to provide demolition and other specialty services requisite to our industrial society. Our way of life and millions of jobs are dependent on commercial explosives.

1120 Nineteenth St., NW, Suite 310, Washington, DC 20036 ◊202-429-9280

International Warehouse Logistics Association

2800 River Road, Suite 260 • Des Plaines, IL 60018-6003
Phone 847.813.4699 • Fax 847.813.0115
www.iwla.com

I|W|L|A

March 1, 2010

The Honorable Joseph Lieberman, Chair
Committee on Homeland Security and Governmental Affairs
340 Dirksen Senate Office Building
Washington, DC 20510

Re: Support for S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act of 2010

Dear Chairman Lieberman:

I am writing to you on behalf of the International Warehouse Logistics Association (IWLA) to express our support for S. 2996, the bipartisan Continuing Chemical Facilities Antiterrorism Security Act of 2010, which was recently introduced by Ranking Member Collins, together with Senators Pryor, Voinovich, and Landrieu. This bill would reauthorize the Department of Homeland Security's (DHS) current chemical facility anti-terrorism standards (CFATS) program until 2015, thus assuring that DHS can remain focused on successfully implementing that program as quickly as possible.

Last November, the House of Representatives passed legislation (H.R. 2868) that would authorize government-mandated product substitution (commonly referred to as "Inherently Safer Technology"). Unlike Senator Collins' bill, the House version could put local jobs at risk by mandating disruptive and costly changes in products and processes.

Because they lack the economies of scale and resources of larger companies, small businesses will be the most vulnerable to the IST provisions of the House bill. The unintended consequences of this provision will not only impact chemical manufacturers, but also resonate throughout the supply chain.

IWLA represents warehouse-based third party logistics providers (3PLs). Our more than 500 member companies provide a wide range of logistics services including warehousing, transportation, and value-added services. Many IWLA members are an integral part of the chemical goods supply chain.

Thank you for your consideration.

Sincerely,

Joel D Anderson

Joel Anderson
President and CEO

"Serving Our Members and the Industry Since 1891"

National Association of Chemical Distributors
NACD
To enhance and communicate the professionalism and stewardship of the chemical distribution industry.

March 1, 2010

The Honorable Susan Collins
United States Senate
Washington, DC 20510
Attn: Brandon Milhorn, Homeland Security LA

Dear Senator Collins,

I am writing to express the support of the National Association of Chemical Distributors (NACD) for S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act, introduced recently by Homeland Security and Governmental Affairs Committee Ranking Member Susan Collins and fellow Committee members Senators Mary Landrieu, David Pryor, and George Voinovich. S. 2996 would extend the authority of the Department of Homeland Security (DHS) to implement the Chemical Facility Anti-Terrorism Standards (CFATS) until October 4, 2015.

NACD has 243 distributor members and 127 Affiliates. NACD members purchase chemical products from manufacturers and process, re-package, warehouse, market, and transport these materials to an industrial customer base of approximately 750,000. Chemical distributors serve a wide variety of industries critical to the nation's health and economy ranging from food and drugs to water treatment to electronics to cosmetics to paints and coatings. Responsible distribution and customer service are key priorities for NACD members.

NACD's member companies have established themselves as leaders in health, safety, security, and environmental performance through implementation of Responsible Distribution, a third-party verified management practice established in 1991 as a condition of membership in the Association. NACD has adopted and implemented security measures as part of Responsible Distribution and has developed a security vulnerability assessment (SVA) that specifically addresses security issues relevant to chemical distribution facilities. NACD members have invested millions of dollars and substantial resources to safeguard their facilities and the transportation of their products.

S. 2996 is a reasonable chemical security bill that would allow the CFATS program to be implemented and evaluated before making changes to it. CFATS is a landmark new security regulation that has been in effect for less than three years. DHS has done a commendable job with limited resources in writing the regulations and setting up the internal infrastructure to be able to implement and enforce the new standards. Chemical facilities have already invested substantial resources into conducting security vulnerability assessments and developing site security plans through CFATS. Because of these efforts, real security measures are being implemented at facilities around the nation.

NACD believes that the approach taken under S. 2996 will enhance the security of chemical facilities much more efficiently and effectively than legislation such as H.R. 2868, the House-passed chemical security bill that includes inherently safer technology (IST) and other non-security related mandates.

NACD strongly opposes mandatory IST consideration and implementation. The act of conducting IST assessments would be extremely costly for chemical distributors. These assessments will require expertise with IST methods, the likelihood of these methods to reduce risk, and their costs. The majority of NACD members are small businesses that do not have teams of chemical and process safety engineers on staff who would be able to conduct the IST assessments. These companies would be forced to hire consultants, who at rates of hundreds of dollar per hour, would easily drive the costs of the assessments into tens of thousands of dollars per facility.

In addition, while some chemical distributors may custom blend substances for customers, the majority do not manufacture chemicals. Their operations involve warehousing, repackaging, and transportation of materials to their customers. They maintain specific inventories of products in order to respond to the needs of these customers. For most facilities, an IST assessment would likely produce limited options that would not justify the cost and effort of the exercise itself. In cases where distributors might be required to reduce inventories of certain products, this would prevent these companies from effectively addressing their customers' needs. Particularly in these tough economic times, this could be the final straw to put some companies out of business, which would result in further job losses. In addition, an IST implementation requirement could lead to a rise in transportation activities, which would increase the likelihood of loading, unloading, or in-transit incidents, including potential security incidents.

The CFATS program already has a built-in incentive for facilities to use the safest methods and processes possible in order to be assigned to a lower risk tier or to completely tier out of the regulation. S. 2996 recognizes this and provides time for the real security measures in CFATS to be implemented and evaluated.

For all of these reasons, NACD strongly urges the Committee to support and approve S. 2996 and to refrain from adopting legislation that would impose IST mandates on facilities.

Thank you for your consideration. Please feel free to contact me or NACD's Vice President of Government Affairs Jennifer Gibson at jgibson@nacd.com or 703/527-6223, ext. 3047 if you have any questions.

Sincerely,

Christopher L. Jahn
President
National Association of Chemical Distributors

GUARDIANS OF YOUR ENVIRONMENT
NATIONAL
PEST
MANAGEMENT
ASSOCIATION inc.®
International

February 26, 2010

The Honorable Susan Collins, Ranking Member
Senate Committee on Homeland Security and Government Affairs
US Senate
Washington, DC 20510

I write on behalf of the National Pest Management Association – a 5,000-member trade group representing professional pest management companies – in support of S. 2996, the Continuing Chemical Facilities Antiterrorism Security Act of 2010.

The legislation is a common sense measure that extends the life of the current chemical security law and associated rulemaking – better known as Chemical Facility Antiterrorism Standards or CFATS – for five years until October 4, 2015. Such action will provide assurances to the pest management professionals and other businesses that have been captured by CFATS that the current regulatory scheme will remain largely the same, safeguarding against the chaos or confusion that would result if Congress passed overreaching legislation such as the House-passed H.R. 2868, which conflicts with and undermines CFATS. More importantly, S. 2996 allows for a rationale, thoughtful evaluation of the current regulatory scheme.

NPMA is also pleased that S. 2996 does not include provisions that go beyond security protections such as language mandating substitute products and processes to a government-selected technology. Such a standard is not measurable and would likely lead to confusion, loss of viable products, and poorer service.

Please feel free to contact me at gharrington@pestworld.org or (703) 352-6762 should you have any questions regarding this matter.

Sincerely,

Gene Harrington
Director, Government Affairs

North American Millers' Association

600 Maryland Avenue, SW • Suite 825 West • Washington, DC 20024
202-484-2200 • Fax 202-488-7416

February 26, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security
Governmental Affairs
U.S. Senate
Washington, DC 20510

The Honorable Susan M. Collins
Ranking Member
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins:

The North American Millers' Association (NAMA) supports bill S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010" sponsored by Senators Susan Collins, Mark Pryor, George Voinovich, and Mary Landrieu. This bipartisan bill is vital in that it will reauthorize the CFATS program through October 2015 without interrupting ongoing implementation efforts by both businesses and government.

NAMA is the trade association representing the wheat, corn, and oat milling industry. NAMA's 47 member companies operate 170 mills in 38 states and Canada. Many people are unaware that CFATS impacts small food processors and millers, who are minor end-users of chemicals of interest.

NAMA supports S. 2996 and the continuation of the CFATS program in order to allow operators of high-risk facilities to do the necessary business planning to implement the facility and procedural modifications required by the current law. This bill will also give DHS and industry the opportunity to continue to make the program functional. Importantly, S. 2996 does not mandate government-selected security measures (e.g., inherently safer technologies) as part of the risk- and performance-based standards. Thank you for holding a hearing on this important issue.

Sincerely,

Jane B. DeMarchi
Director of Government Relations

NPRA

Charles T. Drevna
President

National Petrochemical & Refiners Association

1867 K Street, NW
Suite 700
Washington, DC
20006

202.457.0480 voice
202.457.0486 fax
cdrevna@npra.org

February 25, 2010

Re: Continuing Chemical Facilities Antiterrorism Security Act of 2010

To Whom It May Concern:

NPRA, the National Petrochemical & Refiners Association, writes today in support of S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010." NPRA members include more than 450 companies that supply Americans with a wide variety of products used daily in their homes and businesses. These products include gasoline, diesel fuel, home heating oil, jet fuel, lubricants, and the chemicals that serve as "building blocks" for everything from plastics to clothing to medicine to computers.

S. 2996 is an important step to providing the industry with the regulatory certainty required to continue keeping our country safe from terrorist attacks. By reauthorizing the current Chemical Facility Anti-Terrorism Standards (CFATS) for five years, this legislation will grant DHS the time it needs to fully implement the current program, which will significantly strengthen our national security without undermining our economy. S. 2996 will also allow for voluntary chemical security training programs to ensure that federal, state, and local government officials and emergency response providers are properly equipped and prepared to deal with any potential facility-related emergency. The bill's training programs and exercise drills, along with the current CFATS risk-based performance standards, will serve to strengthen our nation's critical infrastructure.

NPRA cautions against adding Inherently Safer Technology (IST) provisions to chemical facility security legislation as debate on the issue continues. NPRA believes the federal government should not be granted the authority to make engineering and business decisions for our nation's chemical facilities. IST provisions may result in simply transferring risk to other points along the supply chain instead of reducing risks as intended, while hampering security in the process.

Furthermore, IST mandates will impose significant financial hardship on refiners and petrochemical producers who, like all businesses across the country, are already facing challenges due to the current economic recession. In addition to the fact that mandated chemical switching may not reduce risk, some estimates indicate that the process changes imposed by such mandates could cost hundreds of millions of dollars per facility. Such additional operating expenses would be too much for many facilities to bear, particularly given the current financial environment, and would likely drive American jobs overseas.

NPRA

Page 2

Thank you for considering our views on S. 2996 and chemical facility security. NPRA stands ready and willing to work with the Committee and Congress towards the implementation of sound, responsible, effective chemical facility security policy.

Sincerely,

Charles T. Drevna
President, NPRA

PotashCorp®
Helping Nature Provide

James F. Dietz
Executive Vice President
and Chief Operating Officer

March 1, 2010

Senator Susan Collins
Ranking Member
Homeland Security and Government Affairs Committee
413 Dirksen Senate Office Building
Washington, DC 20510

Re: *Continuing Chemical Facility Antiterrorism Security Act of 2010* (S. 2996)

Dear Senator Collins:

We would like to thank you for introducing S. 2996, *Continuing Chemical Facility Antiterrorism Act of 2010*. This legislation will continue the Chemical Facilities Antiterrorism Standards (CFATS) program, which is still in the process of being implemented. Your effort to continue this program will help to ensure that America's chemical facilities are as secure as possible, while allowing industry to work hand in hand with the Department of Homeland Security (DHS).

PotashCorp is the world's largest fertilizer company by capacity, producing the three primary crop nutrients – potash (K), phosphate (P) and nitrogen (N). As the world's leading potash producer, we are responsible for about 20 percent of global capacity.

With operations and business interests in seven countries, PotashCorp is an international enterprise and a key player in meeting the growing challenge of feeding the world, including our facilities in Florida, Georgia, Illinois, Missouri, Nebraska, North Carolina, Ohio, and Texas.

Our company places significant emphasis on the security of our products and has developed premier standards and systems in order to do so. The continuation of the CFATS program will foster further development of secure practices, while ensuring that American farmers have access to the valuable inputs they require.

We support your effort to continue the current CFATS program through S.2996 and we look forward to working with you to make this important bill become law.

Sincerely,

James F. Dietz

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PCS Administration (USA), Inc. | www.potashcorp.com

PSE PUGET SOUND ENERGY
The Energy To Do Great Things

March 2, 2010

The Honorable Joe Lieberman
Chair, Committee on Homeland Security
& Governmental Affairs
United States Senate
340 Dirksen Senate Office Building
Washington, DC 20510

The Honorable Susan Collins
Ranking Member, Committee on Homeland
Security & Governmental Affairs
United States Senate
350 Dirksen Senate Office Building
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins,

In advance of the hearing being held in the Senate Homeland Security and Governmental Affairs Committee on Wednesday, March 3, Puget Sound Energy wishes to express support for S. 2996, the Collins-Pryor-Voinovich-Landrieu bill which proposes to reauthorize the Chemical Facility Anti-Terrorism Standards (CFATS) program through October 2015. Puget Sound Energy (PSE), Washington State's largest electric and natural gas distribution company, supports the passing of this bill.

Since the promulgation of CFATS in 2007, PSE and other members of the American Gas Association (AGA) have worked extensively with the Infrastructure Security Compliance Division of the Department of Homeland Security (DHS) to enhance understanding of natural gas underground storage operations and applications of security requirements for these facilities under CFATS. A lot of time has already been spent analyzing security measures at chemical storage facilities in an effort to develop a security program under CFATS, and this legislation will allow DHS to continue its authority toward implementing a successful CFATS program without interruption.

Puget Sound Energy believes that an issue under consideration to mandate Inherent Safer Technology (IST) as additional security standards for underground natural gas facilities is ineffective in increasing security measures and impracticable for underground natural gas storage. We fully support adoption of S. 2996 to prevent disruption to the ongoing DHS process to implement a successful security program under CFATS.

If you have any questions, please contact Michael Hobbs, Director of Compliance at (425) 456-2702, or michael.hobbs@pse.com. Thank you for your consideration of our perspective.

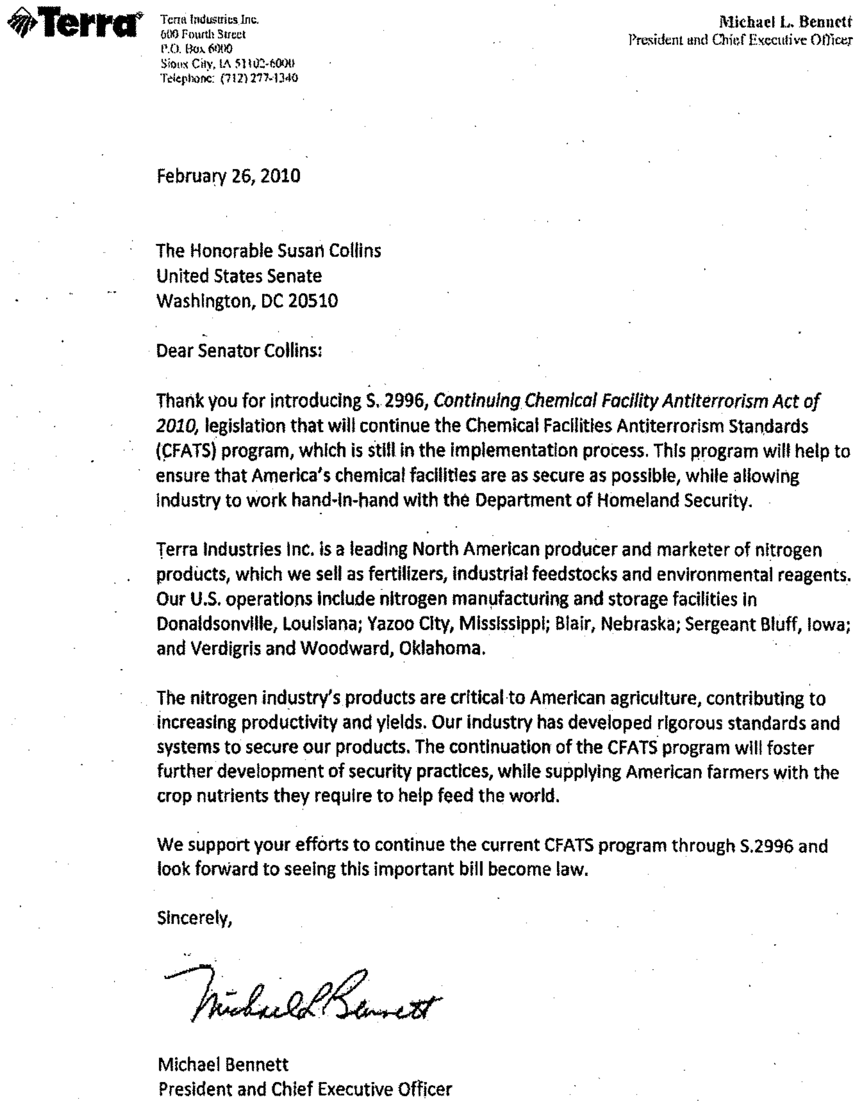
Sincerely,

Bertrand Valdman

Bertrand Valdman
Executive Vice President and
Chief Operating Officer

cc: The Honorable Patty Murray
The Honorable Maria Cantwell

P.O. Box 97034 / Bellevue, WA 98009-9734



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Michael L. Bennett
President and Chief Executive Officer

February 26, 2010

The Honorable Susan Collins
United States Senate
Washington, DC 20510

Dear Senator Collins:

Thank you for introducing S. 2996, *Continuing Chemical Facility Antiterrorism Act of 2010,* legislation that will continue the Chemical Facilities Antiterrorism Standards (CFATS) program, which is still in the implementation process. This program will help to ensure that America's chemical facilities are as secure as possible, while allowing industry to work hand-in-hand with the Department of Homeland Security.

Terra Industries Inc. is a leading North American producer and marketer of nitrogen products, which we sell as fertilizers, industrial feedstocks and environmental reagents. Our U.S. operations include nitrogen manufacturing and storage facilities in Donaldsonville, Louisiana; Yazoo City, Mississippi; Blair, Nebraska; Sergeant Bluff, Iowa; and Verdigris and Woodward, Oklahoma.

The nitrogen industry's products are critical to American agriculture, contributing to increasing productivity and yields. Our industry has developed rigorous standards and systems to secure our products. The continuation of the CFATS program will foster further development of security practices, while supplying American farmers with the crop nutrients they require to help feed the world.

We support your efforts to continue the current CFATS program through S.2996 and look forward to seeing this important bill become law.

Sincerely,

Michael L Bennett

Michael Bennett
President and Chief Executive Officer

TransCanada
In business to deliver

TransCanada
February 26, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

The Honorable Susan M. Collins
Ranking Member
Committee on Homeland Security and Governmental Affairs
U.S. Senate
Washington, DC 20510

Dear Chairman Lieberman and Ranking Member Collins:

As an owner and operator of underground gas storage facilities, TransCanada would like to extend our support for the reauthorization of the CFATS Program as proposed in the Collins-Pryor-Voinovich-Landrieu Senate bill. The extended time to implement provisions of this bill can address concerns that have been raised within our industry related to the applicability of the former version of the bill to underground storage facilities. It will also eliminate the requirements for Inherently Safer Technologies (IST) as proposed in the House bill. We are opposed to the implementation of these requirements as they can potentially increase security threats.

The requirements of the existing CFATS Program will be disruptive to the public as it requires securing areas that can encompass entire communities, commercial districts, roads, waterways, major highways and railway transportation. Securing these would require restricting access to this publicly held infrastructure. The AGA has proposed an amendment to the existing CFATS Program that is consistent with existing Department of Transportation regulatory requirements. The inclusion of these proposals in the CFATS Program will appropriately mitigate security risks while eliminating problematic regulatory requirements.

In closing, I would like to offer TransCanada's support for the Collins-Pryor-Voinovich-Landrieu Senate bill and the elimination of the requirements for Inherently Safer Technologies. Please feel free to contact Glenn Reierson at (403) 920- 2646 should you have additional questions regarding this matter.

Respectfully,

Sandra Ba

Sandra Barnett
Manager,
Environmental US Pipelines

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Williams.

One Williams Center, Suite 4500
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February 26, 2010

The Honorable Susan Collins
Ranking Member, Committee on Homeland
Security and Governmental Affairs
340 Dirksen Senate Office Building
Washington, DC 20510
Via fax: 202-224-9603

Dear Senator Collins:

I am writing to express our company's support for your legislation (and that of your co-sponsors) to extend the Chemical Security Act. The Williams Companies produces, processes and transports natural gas throughout the United States.

Passage of your legislation, the Continuing Chemical Facilities Antiterrorism Security Act, will help our industry continue the collaborative work already started with the Department of Homeland Security to improve security of critical facilities in ways it makes sense to do so.

We would suggest one small change to the legislation. The Department has classified some natural gas underground storage facilities as tiered facilities subject to certain regulations, including possibly securing the perimeter of the facility. This is simply not feasible or necessary in the case of many natural gas storage fields, where the natural gas in question is already secure in the ground. The surface perimeter of the field may involve dozens, even hundreds of land owners who have no connection to the facility but who could be heavily impacted by a requirement, for example, to enclose the perimeter of the facility.

We would request that natural gas storage operations either be exempt from coverage under the program or that the Department be given the discretion to make a case-by case exemption where the rules don't logically apply.

Sincerely,

Bruce List CPP, CFE

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American Water Works Association

March 3, 2010

The Honorable Joseph Lieberman
Chair
The Honorable Susan M. Collins
Ranking Member
Senate Committee on Homeland Security and
Government Affairs

Dear Senator Lieberman and Senator Collins,

The American Water Works Association (AWWA) appreciates the opportunity to provide this written statement concerning the subject of today's hearing, "Chemical Security: Assessing Progress and Charting a Path Forward." While drinking water and wastewater utilities are currently exempt from chemical facility security anti-terrorism standards, known as CFATS, there is apparent interest in Congress in ending those exemptions, as the bill passed by the House of Representatives this fall, H.R. 2868, would do.

As the Committee addresses the issue of chemical security at water utilities, it should first be aware of the proactive security measures that drinking water and wastewater utilities have undertaken for many years. We also want to share with the Committee the factors and variables that apply to a water security system.

Water and wastewater utilities have always been concerned about chemical security and have responded to protect the public

Before and after September 11

Water utilities have been handling gaseous chlorine for more than 100 years and are well aware of what is required to safeguard this material, using a range of methods from secure storage sites up to and including scrubbers that neutralize leaks. Utilities have addressed perimeter security at treatment facilities and reservoirs for years. Utilities that use certain chemicals above a minimum threshold are already subject to the risk management planning provisions under section 112(r) of the Clean Air Act; the emergency planning and community notification provisions under the Emergency Planning and Community Right to Know Act; and additional state and local standards for safe storage and handling of hazardous chemicals.

When Congress passed the Public Health Protection and Bioterrorism Preparedness and Response Act of 2002 (Bioterrorism Act), which required vulnerability assessments and updates to existing emergency response plans, the water sector took those requirements several steps further and developed extensive training programs and tools to support utilities. They also sought measures to protect against the unintentional release of vulnerability assessments that could be used to harm public water systems.

Development of Security Standards and Guidance
In 2006, AWWA initiated a process to develop a standard that defines the minimum requirements for a water utility security program that ensures employee safety, public health protection, public safety, and public confidence. This standard, *ANSI/AWWA G430-09: Security Practices for Operations and Management*, is designed to cover the principal activities of a typical water and/or wastewater utility regardless of size, location, ownership, or regulatory status. This standard builds on the long-standing practice of water utilities of utilizing a multiple-barrier approach for the protection of public health and safety. This approach provides a protective utility-specific security program that results in consistent and measurable outcomes.

In 2009, AWWA formed a partnership with the American Society of Mechanical Engineers - Innovative Technologies Institute (ASME-ITI) to develop a standard, *ASME-ITI/AWWA J100-10: Risk Analysis and Management for Critical Asset Protection (RAMCAP®) Standard for Risk and Resilience Management of Water and Wastewater Systems,* for analyzing and managing the risks associated with malevolent attacks and naturally occurring hazards against critical water infrastructure. When applied, RAMCAP provides a consistent, efficient and technically sound methodology to identify, analyze, quantify, and communicate the level of risk and resilience (*i.e.*, the ability to withstand disruption or to quickly return to an acceptable level of service after an interruption) and the benefits of risk reduction and resilience enhancement. It provides a process for identifying security vulnerabilities, consequences and the likelihood of certain incidents, and provides methods to evaluate the options for reducing these elements of risk. The RAMCAP standard does include recognition of the effort undertaken to meet the requirements of the 2002 Bioterrorism Act.

Water and Wastewater Agency Response Networks (WARNs)
Forty-five states now have a WARN program, a network of utilities helping utilities to respond to and recover from emergencies. WARNs provide a method whereby water/wastewater utilities that have sustained or anticipate damages from natural or human-caused incidents can provide and receive emergency aid and assistance in the form of personnel, equipment, materials, and other associated services as necessary from other water/wastewater utilities. They provide rapid, short-term deployment of emergency services to restore the critical operations of the affected water/wastewater utility. The WARN program provides an important and voluntary mechanism that enhances the resiliency of water sector.

A water utility's responsibilities don't end with *chemical security*; a water utility also has an obligation to protect the *safety of the water supply* from public health risks due to contamination

Disinfectants
Disinfectants are the primary chemicals of concern in water security discussions, with chlorine gas garnering the greatest attention. The choice of disinfectant by a water utility is based on a variety of critically important local factors, such as local water chemistry, particular pathogens, environmental factors, and local infrastructure. This choice is critical to safety of the water supply and is not a matter of simple substitution of one disinfectant for another.

Evaluating changes to treatment processes requires a thorough consideration of the effects different alternatives will have on the quality of water provided to consumers, and the sustainability of the selected treatment process over time and under adverse conditions. The evaluation must be technically transparent for smooth operations and for the review of regulators.

In that light, AWWA in 2009 prepared a decision-support guide for water and wastewater utilities titled, *Selecting Disinfectants in a Security Conscious Environment*. The guide describes a step-by-step process for evaluating and comparing various disinfection strategies, while taking into consideration the unique operating needs of each utility.

Selecting Disinfectants builds on existing water sector engineering standards, manuals of practice, costing tools, and public communication techniques to

- address disinfection objectives, both statutory and those set by the community served;
- reflect local circumstances;
- compare disinfection options consistently;
- take into account operational, process, and supply-chain reliability factors; as well as environmental, operator, and community safety considerations;
- provide transparency in the decision-making process; and
- incorporate appropriate risk communication within the decision-making process and the community.

As outlined in the document *Selecting Disinfectants in a Security Conscious Environment*, drinking water utilities must tailor their treatment and distribution processes according to regulatory obligations (such as the federal requirement to use chlorine in some form and to achieve certain levels of disinfection), to critical variations in source-water characteristics (such as temperatures, pH, pathogens, etc.), and to other local factors (such as delivery options for disinfectant chemicals, the need to maintain reserve supplies in the event of supply interruption, spatial limitations at the plant site, local ambient temperatures that affect the "shelf life" of chemicals and the attendant chemical degradation and breakdown products, etc. Attachment 1 provides tables showing the factors that must be weighed in choosing among disinfectants.

In addition, recent studies have provided additional information on important factors to be considered regarding the use of bulk hypochlorite and on-site generation of a disinfectant instead of gaseous chlorine. In both instances, if not produced and managed properly, the potential exists for introduction of contaminants that might not otherwise be present in systems using gaseous chlorine, namely bromate, perchlorate and chlorate, all of which are regulated or under review. The findings from the study, "Hypochlorite – An Assessment of Factors That Influence the Formation of Perchlorate and Other Contaminants" are being used to assist utilities in the management and use of hypochlorite products, which degrade at differing rates depending on pH, temperature and other storage conditions, to mitigate the potential for elevated levels of certain water quality contaminants.

The Impact of IST

One provision of H.R.2868 would require utilities in the high-risk tiers to assess "inherently safer technologies" (ISTs) and then possibly be subject to a state mandate to implement them. While not everyone agrees on the exact definition and intent of IST in this legislative context, the core elements of IST are standards that are already incorporated into modern water treatment facility design and need no further legislative mandate. They include:

- Minimizing quantities of hazardous materials on-site,
- Substituting safer materials or processes when possible,
- Moderating of operating conditions to reduce associated risks, and
- Overall simplicity so as to minimize the potential for equipment failure and human error.

Because of these critical factors and variables, AWWA has long maintained that the choice of disinfectant should lie with local officials. In the past, there have been proposals to have the IST decision lie with federal officials. There are more than 54,000 community water systems in the United States. While not all of them would face IST determinations, we believe making this a federal decision would be unworkable as federal officials would be even more removed from understanding local factors that drive disinfection decisions at individual utilities.

The House bill, under the section titled, "Methods to Reduce the Consequences of a Chemical Release from an Intentional Act," would place the final decision on which materials – primarily disinfectants – or processes a water utility may use outside the local community and with state drinking water primacy agencies. State agencies simply do not have the resources to carry a new mission such as this. They are already understaffed to carry out their existing mandates.

AWWA's Recommendations for Increased Security

Since September 11, the water sector has taken significant steps to address homeland security concerns. Water systems serving more than 3,300 people have developed vulnerability assessments and emergency response plans. Most have restricted access and other measures to secure critical assets, including chemical supplies. Utilities have also used techniques to ensure that vulnerability assessments are protected against harmful release such that the public would be put at risk.

AWWA has also invested significant resources in developing tools and standards that water systems use to ensure they are meeting the highest level of performance on security issues. In light of the steps the water sector has already taken to address security, it does not make sense (and could cause harm) to legislate outcomes which prohibit the use of particular chemicals, including chlorine gas.

AWWA urges members of Congress to support chemical security legislation that applies to water utilities only if it:

1. Does not include authority to mandate the use of "inherently safer technology." Decisions concerning utility choice of disinfectant are complex, are based on critical local factors, and are not a matter of simple substitution of one disinfectant for another;

2. Because such decisions are based on critical local factors, legislation must retain local decision making authority using processes that give due consideration to all risks; and

3. Provides adequate protection of sensitive information. Personnel (including collective bargaining agents) who are not water system employees, their contractors, or government agents, should not have access to or be involved in the development of vulnerability assessments or site security plans.

AWWA would be happy to work with the Senate further as it deliberates on these important issues.

Sincerely,

Tom Curtis
Deputy Executive Director for Government Affairs

Table 3-1 Comparison of attributes for disinfection options*

		Sodium Hypochlorite				
Attribute	**Chlorine Gas†**	**Bulk Delivered†**	**On-site Generation†**	**UV†**	**Ozone†**	**Chloramine***
Water quality: Protect public health—Ability to meet disinfection regulatory requirements and objectives reliably	For drinking water, gas chlorine can be used to achieve a free chlorine residual and effectively meet virus and *Giardia* inactivation requirements. For drinking water, free chlorine can be used as the residual disinfectant throughout the distribution system. For drinking water, free chlorine is ineffective for inactivating *Cryptosporidium* oocysts. For systems that require *Cryptosporidium* inactivation, another disinfectant may be required. The use of gas chlorine to achieve a free chlorine residual results in the formation of regulated DBPs: TTHMs and HAA5.	For drinking water, bulk hypochlorite can be used to achieve a free chlorine residual and effectively meet virus and *Giardia* inactivation requirements. For drinking water, free chlorine can be used as the residual disinfectant throughout the distribution system. For drinking water, free chlorine is ineffective for inactivating *Cryptosporidium* oocysts. For systems that require *Cryptosporidium* inactivation, another disinfectant may be required. The use of hypochlorite to achieve a free chlorine residual results in the formation of regulated DBPs: TTHMs and HAA5.	For drinking water, on-site–generated hypochlorite can be used to achieve a free chlorine residual and effectively meet virus and *Giardia* inactivation requirements. For drinking water, free chlorine can be used as the residual disinfectant throughout the distribution system. For drinking water, free chlorine is ineffective for inactivating *Cryptosporidium* oocysts. For systems that require *Cryptosporidium* inactivation, another disinfectant may be required. The use of on-site–generated hypochlorite to achieve a free chlorine residual results in the formation of regulated DBPs: TTHMs and HAA5.	For drinking water, UV can be used to effectively meet *Giardia* and *Cryptosporidium* inactivation requirements. With higher doses, UV can also be used for virus inactivation. For drinking water, free chlorine or monochloramine is necessary to maintain residual disinfectant throughout the distribution system. The use of chlorine to achieve a free chlorine residual results in the formation of regulated DBPs: TTHMs and HAA5.	For drinking water, ozone can be used to effectively meet virus and *Giardia* inactivation requirements. Ozone can also be used to inactivate *Cryptosporidium*; however, CT requirements are high for cold water temperatures consequently for waters with high bromide concentrations, bromate may be formed at levels about the regulatory limits. For drinking water, free chlorine or monochloramine is necessary to maintain residual disinfectant throughout the distribution system. The use of chlorine to achieve a free chlorine residual results in the formation of regulated DBPs: TTHMs and HAA5. The use of ozone together with biological filtration removes organics and can be an effective part of a strategy to reduce DBP formation.	For drinking water, monochloramine can be used in combination with other disinfectants to meet inactivation requirements. For drinking water, monochloramine can be used as the residual disinfectant throughout the distribution system. For drinking water, monochloramine is ineffective for inactivating *Giardia* or *Cryptosporidium*. Because surface water systems must achieve *Giardia* inactivation, the use of another disinfectant is required. For systems that require *Cryptosporidium* inactivation, the use of another disinfectant is necessary. The application of a monochloramine residual results in slower formation of regulated DBPs—TTHMs and HAA5—compared to a free chlorine residual.

(Table continued next page)

Table 3-1 Comparison of attributes for disinfection options* (continued)

Attribute	Chlorine Gas†	Sodium Hypochlorite		UV†	Ozone†	Chloramine*
		Bulk Delivered†	On-site Generation†			
Water quality: Protect public health (continued)	For wastewater and water reuse, gas chlorine can be used to achieve a free chlorine residual and effectively meet bacterial requirements for effluent discharge.	For wastewater and water reuse, bulk hypochlorite can be used to achieve a free chlorine residual and effectively meet bacterial requirements for effluent discharge.	For wastewater and water reuse, on-site–generated hypochlorite can be used to achieve a free chlorine residual and effectively meet bacterial requirements for effluent discharge.	For wastewater and water reuse, UV disinfection can be used to effectively meet bacterial requirements for effluent discharge.	For wastewater and water reuse, ozone can be used to effectively meet bacterial requirements for effluent discharge.	For wastewater and water reuse, chloramine can be used to effectively meet bacterial requirements for effluent discharge.
Operator safety—Risk from potential exposure to hazardous chemicals or other hazards posed to staff who operate and maintain the system. Risks include inhalation of gases, skin exposure, and electrical systems hazards.	Hazardous gas that is toxic if inhaled and may be fatal at high concentrations. Impacts of a potential leak on workers (and the surrounding community) must be addressed through adequate safety systems and programs.	Corrosive oxidant that requires proper personal protection equipment for workers. Skin irritant that may result in chemical burns to broken skin. May damage eyes. Mixing with acidic compounds and alkalis releases chlorine gas.	Potentially explosive hydrogen gas must be vented to the outdoors.	Safety measures should be incorporated to ensure no exposure of operators to UV light. Damage to vision for prolonged exposure without eye protection. Because UV lamps contain mercury, provisions for lamp recycling and emergency response are necessary.	Typically generated from liquid oxygen, which must be handled with care. Liquid oxygen is an oxidizer and explosive when in contact with combustible materials. Inhalation of ozone can be hazardous. Ambient air ozone monitors must be installed in all areas where ozone may be present. Ozone off-gas is hazardous and must be collected and destroyed before release to prevent operator exposure.	Operator safety issues depend on the form of chlorine and ammonia used. See previous entries. Aqueous ammonia (if used) is classified as a toxic and an irritant, and corresponding safety provisions are required. Anhydrous ammonia (if used) has safety issues similar to gas chlorine.
Process reliability—Ability of the disinfection system to stay in service and operate as intended.	Well-established and proven disinfection process. Redundancy relatively easy to achieve.	Well-established and proven disinfection process that is relatively simple and easy to operate.	Systems are more complex, with several mechanical components. In many cases, service contracts are used to keep systems functional.	Established and proven disinfection process for drinking water, wastewater, and reuse applications.	Established and proven disinfection process for drinking water. Ozone systems are relatively complex, with four elements (gas feed system, generation, contactor, and off-gas destruction).	Established and proven disinfection process for drinking water and wastewater applications.

(Table continued next page)

Table 3-1 Comparison of attributes for disinfection options* (continued)

Attribute	Chlorine Gas†	Sodium Hypochlorite Bulk Delivered†	Sodium Hypochlorite On-site Generation†	UV†	Ozone†	Chloramine*
Process reliability (continued)	For wastewater disinfection, requirements for dechlorination prior to discharge result in the need for a second chemical system and in turn, more complicated O&M and process control requirements.	Redundancy relatively easy to achieve. Bulk hypochlorite degrades over time, especially at high temperature or from exposure to UV light. Pumping and feed systems can clog because of crystallization and inadequate venting. For wastewater disinfection, requirements for dechlorination prior to discharge result in the need for a second chemical system, in turn, resulting in more complicated O&M and process control requirements.	Redundancy difficult and costly to achieve. For drinking water, high-quality salt should be used to minimize bromate formation during generation. Impact on finished water TDS should be considered. For wastewater disinfection, requirements for dechlorination prior to discharge result in the need for a second chemical system, resulting in more complicated O&M and process control requirements.	Validation testing, evaluation of test results, and application of test results for on-site use is complex. Redundancy difficult and costly to achieve. UV absorbance (or UV transmittance) must be understood to operate UV disinfection effectively. For drinking water, some form of chlorine will also be required for residual disinfection.	Systems for disinfection require regular monitoring of ozone residual concentration. Redundancy difficult and costly to achieve. Well-establish disinfection process for drinking water. Not as well established for wastewater and water reuse applications. For drinking water, some form of chlorine will also be required for residual disinfection.	For drinking water, must maintain specific chlorine-to-ammonia ratio to prevent taste and odor issues and potential nitrification in distribution system. Redundancy relatively easy to achieve. For drinking water, requires two chemical systems: a chlorine system, and an ammonia system. For wastewater, only one chemical system (chlorine) required if effluent is not nitrified. For wastewater disinfection, requirements for dechlorination prior to discharge result in the need for a second chemical system, in turn, resulting in more complicated O&M and process control requirements.
Resiliency—Ability of the disinfection system to be quickly returned to service after a problem occurs.	Established approach. Operator experience facilitates rapid trouble-shooting. Minimal electrical power requirement.	Established approach. Operator experience facilitates rapid trouble-shooting. Minimal electrical power requirement.	Relatively complex system may require outside support (e.g., system manufacturer) for trouble-shooting. Significant electrical power requirement.	Relatively complex system may require outside support (e.g., system manufacturer) for trouble-shooting. Significant electrical power requirement.	Relatively complex system may require outside support (e.g., system manufacturer) for trouble-shooting. Significant electrical power requirement.	Established approach. Operator facilitates rapid trouble-shooting. Minimal electrical power requirement.

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Table 3-1 Comparison of attributes for disinfection options[*] (continued)

Attribute	Chlorine Gas[†]	Sodium Hypochlorite Bulk Delivered[†]	Sodium Hypochlorite On-site Generation[†]	UV[†]	Ozone[†]	Chloramine[*]
Supply chain reliability—Ability of disinfection system to remain stocked with all necessary components including consumables such as chemicals.	One chemical is required for disinfection. For wastewater applications, a dechlorination chemical may also be required.	One chemical is required for disinfection. For wastewater applications, a dechlorination chemical may also be required.	One consumable (salt) is required for disinfection. For wastewater applications, a dechlorination chemical may also be required.	UV lamps typically last 3,000 to 12,000 hours before replacement is required. Many facilities stock spare parts. For drinking water, wastewater and water reuse applications, a chlorine system will be required.	If ozone is generated from liquid oxygen, one chemical is required for disinfection. For drinking water, many facilities may also use an ozone quenching chemical. For drinking water, wastewater and water reuse applications, a chlorine system will be required.	For drinking water applications, two chemicals (chlorine and ammonia) are required.
Community safety and security—Risk posed to the public living near the facility or chemical transportation route who could be exposed and affected by a chemical release or spill.	Highest relative risk due to potential for leak. Actual risk depends on distance to nearest public receptor, atmospheric conditions, amount of chlorine stored, and other factors. Potential traffic accident associated with truck traffic presents a facility and truck route–specific risk. Risks during transport may in some cases be higher than risk of facility leak.	Highest relative risk due to potential for spill or inadvertent mixing with other treatment chemicals. Actual risk depends on distance to nearest public receptor, atmospheric conditions, amount of sodium hypochlorite managed, and other factors. Potential traffic accident associated with truck traffic presents a facility and truck route–specific risk.	Highest relative risk due to potential for spill. Actual risk depends on distance to nearest public receptor, atmospheric conditions, amount of sodium hypochlorite managed, and other factors. Potential traffic accident associated with salt truck traffic presents a facility and truck route—specific risk.	For drinking water, small risk of lamp breakage in service, causing release of mercury and public exposure.	Potential risk from truck traffic accidents for delivery of liquid oxygen. Some potential risk of fire or explosion at treatment facility, but likely low public risk.	Community safety and security issues for chlorine and ammonia depend on the form of the chemicals used. See previous entries. Potential traffic accident associated with truck traffic presents a facility and truck route–specific risk. Risks during transport of chlorine and ammonia may in some cases be higher than risk of facility leak.

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Table 3-1 Comparison of attributes for disinfection options* (continued)

		Sodium Hypochlorite				
Attribute	**Chlorine Gas†**	**Bulk Delivered†**	**On-site Generation†**	**UV†**	**Ozone†**	**Chloramine***
Customer support—Level of support for the disinfection system from the water system's customers.	Discussion with customers will likely include risk associated with gas chlorine transport, storage, and use.	Discussion with customers will likely include truck traffic and risk associated with bulk hypochlorite transport, storage, and use.	Discussion with customers will likely include truck traffic and risk associated with salt transport.	Discussion with customers may include risk associated with presence of mercury in UV lamps.	Discussion with customers will likely include truck traffic and risk associated with liquid oxygen transport, storage, and use. For drinking water, effectiveness for taste and odor control may enhance acceptance by customers.	Discussion with customers will likely include truck traffic and risk associated with both chlorine and ammonia transport, storage, and use. For drinking water, outreach to specific water users including hospitals, kidney dialysis patients, and aquaculture enthusiasts is necessary well in advance of conversion to residual monochloramine use.
Aesthetics—Ability of disinfection system to assist in achieving finished water with good taste and odor characteristics (drinking water).	For drinking water, some customers may notice and possibly object to chlorinous taste and odor. For drinking water, free chlorine is a moderate oxidant and may assist with some minor taste and odor episodes. For wastewater, chlorine may be applied at various points during treatment for aesthetic and water quality reasons, including control of odors.	For drinking water, some customers may notice and possibly object to chlorinous taste and odor. For drinking water, free chlorine is a moderate oxidant and may assist with some minor taste and odor episodes. For wastewater, chlorine may be applied at various points during treatment for aesthetic and water quality reasons, including control of odors.	For drinking water, some customers may notice and possibly object to chlorinous taste and odor. For drinking water, free chlorine is a moderate oxidant and may assist with some minor taste and odor episodes. For wastewater, chlorine may be applied at various points during treatment for aesthetic and water quality reasons, including control of odors.	For drinking water, it is still necessary to use chlorine or monochloramine for residual disinfection. For drinking water, at disinfection doses, UV does not improve taste or odor of the water. For wastewater, most facilities still use chlorine for ancillary plant purposes. Chlorine may be applied at various points during treatment for aesthetic and water quality reasons, including control of odors.	For drinking water, ozone is very effective for oxidation of taste and odor–causing compounds and, combined with downstream biological filtration, for removal of organics. For drinking water, it is still necessary to use chlorine or monochloramine for residual disinfection. Some customers may notice and possibly object to chlorinous taste and odor.	For drinking water, some customers may prefer water with monochloramine as the residual disinfectant to water with free chlorine as the residual disinfectant due to less chlorinous taste and odor. For drinking water, monochlorine is a weak oxidant and may not assist with minor taste and odor episodes. For wastewater, chlorine may be applied at various points during treatment for aesthetic and water quality reasons, including control of odors.

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Table 3-1 Comparison of attributes for disinfection options* (continued)

		Sodium Hypochlorite				
Attribute	**Chlorine Gas**†	**Bulk Delivered**†	**On-site Generation**†	**UV**†	**Ozone**†	**Chloramine***
Aesthetics (continued)					For wastewater, facilities may still use chlorine for ancillary plant purposes. Chlorine may be applied at various points during treatment for aesthetic and water quality reasons, including control of odors.	
Environmental impacts—GHG emissions associated directly with the disinfection system, and impacts of disinfection system on receiving water (for wastewater disinfection).	Low power use. Dechlorination is typically required for wastewater applications prior to discharge. GHG emission estimate for wastewater applications: 0.90 to 3.4 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b} GHG emission estimate for drinking water applications: 0.56 to 2.2 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b}	Low power use. Dechlorination is typically required for wastewater applications prior to discharge. GHG emission estimate for wastewater applications: 0.23 to 0.89 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b} GHG emission estimate for drinking water applications: 0.16 to 0.63 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b}	Relatively low power use. Dechlorination is typically required for wastewater applications prior to discharge. GHG emission estimate for wastewater applications: 9.3 to 36 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b} GHG emission estimate for drinking water applications: 5.6 to 22 metric tons CO_2 equivalent per year per average daily flow (mgd).*,†	Higher power use compared to chlorine options. GHG emission estimate for wastewater applications: 12 to 47 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b} GHG emission estimate for drinking water applications: 4.0 to 15 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b}	Higher power use compared to chlorine options. GHG emission estimate for drinking water applications: 8.4 to 32 metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b}	Low power use. Dechlorination is typically required for wastewater applications prior to discharge. GHG emission estimate for drinking water applications: 0.7 to 2.7metric tons CO_2 equivalent per year per average daily flow (mgd).^{a,b}

CT—contact time, DBP—disinfection by-product, GHG—greenhouse gas, HAA5—sum of 5 haloacetic acids, LOX—liquid oxygen, O&M—operations and maintenance, TDS—total dissolved solids, TTHM—total trihalomethane, UV— ultraviolet

*This table does not include all disinfectants. Other options include calcium hypochlorite, chlorine dioxide, and advanced oxidation.

†Some water systems may require using more than one disinfectant.

a Direct GHG emissions associated with the generation of the power required to operate the disinfection system. Indirect GHG emissions associated with activities such as the production of chemicals or equipment are not included.

b An estimate of GHG emissions associated with chemical delivery can be calculated based on chemical delivery trucks emitting 1.7×10^{-3} metric tons of CO_2 equivalent GHGs per mile driven, assuming heavy-duty diesel trucks.

NPRA

WRITTEN STATEMENT OF

Charles T. Drevna

PRESIDENT

NATIONAL PETROCHEMICAL & REFINERS ASSOCIATION (NPRA)

AS SUBMITTED TO THE

Senate Homeland Security and Government Affairs Committee

On

Chemical Security: Assessing Progress and Charting a Path Forward

March 3, 2010

I. Introduction

NPRA, the National Petrochemical & Refiners Association, appreciates the opportunity to submit written testimony for this important and timely hearing regarding chemical facility security. Our statement focuses on the progress of security measures our members have initiated, our views on the current CFATS program, thoughts on a path forward and our support for S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010."

NPRA members include more than 450 companies, which represent virtually all U.S. refiners and petrochemical manufacturers and their suppliers and vendors. NPRA member companies supply consumers with a wide variety of products used daily in their homes and businesses. These products include gasoline, diesel fuel, home heating oil, jet fuel, lubricants, and the chemicals that serve as building blocks for everything from plastics to clothing, medicine, and computers.

II. S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010"

NPRA supports S. 2996, the "Continuing Chemical Facilities Antiterrorism Security Act of 2010." S. 2996 is an important step to providing the industry with the regulatory certainty required to continue keeping our country safe from terrorist attacks. By reauthorizing the current Chemical Facility Anti-Terrorism Standards (CFATS) for five years, this legislation will grant DHS the time it needs to fully implement the current program, which will significantly strengthen our national security without undermining our economy. S. 2996 will also allow for voluntary chemical security training programs to ensure that federal, state, and local government officials and emergency response providers are properly equipped and prepared to deal with any potential facility-related emergency. The bill's training programs and exercise drills, along with the current CFATS risk-based performance standards, will serve to strengthen our nation's critical infrastructure.

III. Background

Maintaining the security of our facilities always has been and remains a top priority at refineries and petrochemical plants. Operators of those facilities are fully engaged in the maintenance and enhancement of facility security. These businesses have long operated globally, often in unstable regions overseas where security is an integral part of providing for the world's energy and petrochemical needs.

In the immediate aftermath of the September 11, 2001 attacks, our nation realized that additional and unconventional threats must be considered in order to protect our homeland. In full understanding of the potential and significance of these threats, our industry did not wait for adoption of new government mandates before implementing additional, far-reaching facility security measures to address these new threats. Instead, refining and petrochemical facilities immediately initiated several measures to strengthen and enhance security, including: 100 percent ID verification and bag screening; comprehensive vehicular inspections; limitations on visitor access and tours; and a reduction in plant access points to minimize risk.

In compliance with current Chemical Facility Anti-Terrorism Standards (CFATS) regulations, our members have submitted their Top Screens, are completing their Site Vulnerability Assessments (SVAs), and formulating their Site Security Plans (SSPs) in accordance with the Department of Homeland Security's (DHS) timetables. Throughout this process, NPRA and its members have developed productive and collaborative working relationships with DHS and other key federal agencies, and strengthened relationships with state and local law enforcement offices. These relationships ensure, to the extent possible, that all parties obtain and exchange information critical to the maintenance of infrastructure security, enabling all to respond rapidly to terrorist threats.

NPRA members have held joint training exercises simulating terrorist attacks, and NPRA has developed a comprehensive annual Security Conference, now in its ninth year, bringing federal and state government security officials and industry security practitioners together to discuss the constantly evolving security landscape. Industry personnel from the largest companies to the smallest have shared best practices at NPRA meetings and conferences. NPRA and its members are also key members of both the Oil and Natural Gas and the Chemical Sector Coordinating Councils. Our members have engaged in numerous technical consultations with DHS on existing regulations and have consistently participated in national-level exercises and voluntary programs. In addition, NPRA testified twice before Congress during the initial development of the CFATS program.

IV. The Current CFATS Program

NPRA firmly believes that the current CFATS program is a success. Since the creation of the CFATS program, there has been a surge in security awareness across all industries and among industry employees. As a result of CFATS, facility operators and employees have become keenly aware of vulnerabilities at each site, potential off-site consequences, and methods to reduce risks at these sites. Our members continue to implement elements of the existing CFATS regulations in accordance with DHS timetables. Our members also report that the current regulations have helped them better manage their inventory of chemicals. Furthermore, many members regularly conduct security awareness training and complete SVAs to enhance security at sites that do not fall under the CFATS program. NPRA and its members have an excellent working relationship with DHS and have repeatedly volunteered to help the Department through activities ranging from site tours to joint training activities. In order to fully gauge the success of the current version of CFATS, however, all sites from every tier should be inspected to allow for the complete implementation of the current program. Only then can Congress determine whether or not significant changes to this highly successful program are required.

Specific focus on the existing CFATS program and related security activities indicates the following:

- The refining and petrochemical industry will continue to maintain and improve its security operations to protect the vital network that provides a reliable supply of fuels and other petroleum and petrochemical products required to keep our nation strong and our economy growing.

- Essential working relationships and information networks have been established between government security agencies and the refining and petrochemical community to exchange "real-time" intelligence data on security issues. These relationships allow for rapid responses to terrorist threats. NPRA believes that unwarranted and potentially counter-productive revisions to this successful program could significantly alter these relationships, thus placing unnecessary obstacles in the way of the nation's over-arching goals regarding homeland security.

- Industry has partnered with the Department of Homeland Security on many important security initiatives and programs, including the Risk Assessment Methodology for Critical Asset Protection (RAMCAP), the Homeland Security Information Network (HSIN), Buffer Zone Protection Plans, SVAs, Site Security Plans (SSPs), and Industry Sector Councils.

- Many of our members comply with the security requirements under the Maritime Transportation Security Act (MTSA), a program administered by the U.S. Coast Guard (USCG). The Coast Guard and NPRA members have worked together closely to achieve the security goals of the Act. If CFATS and MTSA are harmonized, the work that sites have done to comply with MTSA must be recognized. Further, NPRA believes that the MTSA sites should not be subject to dual inspections and that the USCG should continue its role at traditional MTSA sites.

V. Inherently Safer Technology

Before a discussion of Inherently Safer Technology (IST) and NPRA's continued opposition to its inclusion in any legislation can take place, it is important to understand the scientific concepts of hazard and risk. NPRA believes this discussion to be important so that chemical information is not only understood, but also not misinterpreted.

In essence, a hazard is part of a chemical's nature, while risk is interdependent on the conditions of the chemical's storage, handling, and ultimate use. In the context of describing chemicals, a hazard is a characteristic of a substance that gives it the *potential* to produce an undesirable consequence *under certain conditions*. The inherent hazard of a chemical does not change and does not depend on circumstance. Conversely, risk can (and usually does) vary with conditions. It is related to the *likelihood* that an undesirable event could take place and the consequences the event could produce; in other words, the likelihood that a potentially hazardous substance could cause harm.

For example, cars inherently comprise hazardous properties (e.g., heavy weight, flammable fuel) that *under certain conditions*—high speed, bad road conditions, etc.—can produce serious damage. The weight of the car and the flammability of the fuel that propels it—two of its hazards—do not change. Operated under proper speeds and conditions, cars are considered to pose an acceptable degree of risk because they are less likely to be involved in an accident. Furthermore, society accepts the risks inherent in automobile use because the benefits of transportation are deemed to outweigh the risks.

Chemicals also can have hazardous characteristics. Just as conditions affect the risk posed by operating a car, the risk a specific chemical poses depends upon the conditions of how and where the chemical is stored, used and handled. These conditions are as, if not more, important as the chemical's inherent properties when trying to determine its degree of risk. For instance, household oven cleaners and drain openers are corrosive—a hazardous property—and can cause severe burns on the skin and permanent blindness if splashed into the eyes and not treated immediately. Despite these hazardous characteristics, these products, and many others, are used in most households because of their desired properties. When these products are clearly labeled, as required by law, and used with adequate precautions, they do not pose a significant risk. In fact, virtually any hazardous substance can be handled safely with the right precautions. Consumers accept this fact and use hazardous products accordingly.

In relation to the current legislative debate, and as several legislative initiatives considered to date have included IST mandates, IST is perhaps the most misunderstood and controversial aspect of newly proposed chemical site security legislation. NPRA has been, and remains opposed to the inclusion of IST mandates in any chemical facility security legislation. While it may seem self-explanatory, the term as used in chemistry and engineering may be misleading to non-scientists.

Many non-scientists have been led to believe that the only way to ensure security at chemical facilities is by reducing the amount of hazardous substances used in chemical manufacturing and processing or by a "simple" chemical substitution. Application of IST, however, is bound by the laws of physics and nature; a simple reduction or switch in the use of hazardous chemicals is rarely possible within the context of a particular reaction or process. In other words, mandating IST would fail science under certain circumstances. When such reductions are possible, they often do not reduce overall risk; rather, they result in the transfer of risk to other points in a chemical process or the supply chain. To place the current IST debate in context, our statement illustrates the limitations of substitution in the field of chemistry, discusses the difference between a hazard and a risk, and concludes with an explanation of why reducing a hazard in a process does not necessarily reduce the overall risk.

IST is a conceptual and complex framework that covers procedures, equipment, protection and, when feasible, the use of less hazardous chemicals. Its premise is founded on the belief that if a particular *hazard* can be reduced, the *overall risk* associated with a chemical process will also be reduced. In its simplicity, it is an intuitive concept; however, reality is not always that intuitive or simple. A reduction in hazard will reduce overall risk if, and only if, that hazard is not displaced to another time or location, or does not amplify another hazard. If the hazard is displaced, then the risk will simply be transferred or increased, not reduced. Seemingly simple reductions in hazard may affect overall risk.

Substituting Sulfuric Acid for Hydrofluoric Acid at Petroleum Refineries

One example of the unintended consequences of mandatory chemical substitution lies in the often cited scenario of substituting sulfuric acid for hydrofluoric acid at petroleum refineries. In its overly-simplistic report on IST, *Chemical Security 101: What You Don't Have Can't Leak, or Be Blown Up By Terrorists*, the Center for American Progress highlights petroleum refinery alkylation units as an example of how easy it is to switch from one chemical to another: specifically, replacing hydrofluoric acid with sulfuric acid as a catalyst. What that report fails to mention, however, is the fact that switching from hydrofluoric acid to sulfuric acid requires a completely rebuilt alkylation unit costing upwards of $100 million in some cases. The report also fails to mention that it requires approximately 250 times the amount of sulfuric acid to achieve the same catalytic performance as hydrofluoric acid. For a 10,000 barrel-a-day alkylation unit, this equates to one to two truckloads of hydrofluoric acid delivered to the refinery each month, compared to three or four truckloads of regenerated sulfuric acid coming in and three or four truckloads of spent sulfuric acid going out ***each day***. In essence, the risk—which is actually quite small—of a terrorism incident at a refinery does not change substantially; ***however, the transport and worker safety risks increase greatly due to the vastly increased amount of catalyst that would be needed.***

It should be readily apparent that the decision to use a particular alkylation process involves very careful and deliberate thought. Both catalysts have advantages and disadvantages in areas such as environmental impact, safety and cost. The previous example is not intended to demonstrate a preference for one alkylation process over another; rather, the intent is to explain the real-world challenges facing refiners when confronted with potentially mandated IST requirements in the context of security. Decisions on alkylation techniques are best left to practitioners of the scientific disciplines that ensure safety and security at the refining facilities.

VI. Conclusion

Refiners and petrochemical manufacturers are committed to complying with CFATS. NPRA does not oppose a reasonable review of the current program and making appropriate adjustments where needed. However, the existing program is still developing and should be allowed to be fully implemented before it is significantly altered. The program should also be made permanent to provide regulatory certainty and a stable security framework for the future. NPRA supports such an extension of the current program and an elimination of the sunset provision in existing law. S. 2996 is an important first step towards achieving this goal.

We urge the Committee to pass S. 2996 as currently drafted. We also urge the Committee to reject any attempts to amend S. 2996 with provisions that would undermine both security and economic development. IST decisions should be left to individual sites and not mandated by DHS. Chemical engineering decisions must be made by qualified chemical engineers, not by government officials lacking the requisite scientific background. Political considerations must not outweigh fundamental security principles.

NPRA appreciates this opportunity to submit this statement for the record and stands ready and willing to work with the Committee and Congress towards the implementation of sound, responsible, effective chemical facility security policy. Thank you for the opportunity to submit this statement for the record.

Submitted to the

HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS COMMITTEE
UNITED STATES SENATE

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On

U.S. Department of Homeland Security's Reauthorization of Chemical Facility Anti-Terrorism Standards

Wednesday, March 3, 2010

Introduction

My name is M. Sam Mannan and I hold a BS, MS, and PhD in chemical engineering. I am a registered professional engineer in the states of Louisiana and Texas and I am a certified safety professional. I am a Fellow of the American Institute of Chemical Engineers and a member of the American Society of Safety Engineers, the International Institute of Ammonia Refrigeration, and the National Fire Protection Association. I am Director of the Mary Kay O'Connor Process Safety Center, holder of the T. Michael O'Connor Chair I in Chemical Engineering, and Regents Professor of Chemical Engineering at Texas A&M University. The Center seeks to develop safer processes, equipment, procedures, and management strategies that will minimize losses in the process industry. My area of expertise within the chemical engineering discipline is process safety. I teach process safety engineering both at the undergraduate and graduate level. I also teach continuing education courses on process safety and other specialty process safety courses in the United States and overseas. My research and practice is primarily in the area of process safety and related subjects. The opinions presented in this document represent my personal position on these issues. These opinions are based on my education, experience, research and training.

Chemical security and protection of the chemical infrastructure is of extreme importance to our nation, and I am pleased that the US Congress is continuing to pay attention to issues relating to Chemical Facility Anti-Terrorism. I have provided testimony previously on this subject to the US House of Representatives Subcommittee on Transportation Security and Infrastructure Protection of the Committee on Homeland Security, on December 12, 2007 (please see attached). Since then I have continued to study various issues related to inherent safety and the implementation of inherent safety. While we have gained additional insight about inherent safety issues since December 12, 2007, my opinions remain much the same as then.

While inherent safety options are one potential approach to chemical security and protection of the chemical infrastructure, there is much more that can be done in a comprehensive approach. Such an approach should be based upon the triple-pronged philosophy: evaluation and assessment, prevention and planning, and response and recovery. Planning and preparedness is required for all three areas. Only through a comprehensive, uniform and risk-based approach can we protect the people and communities of our nation as well as protect our nation's critical chemical infrastructure. In summary, I would like to respectfully present the following opinions to the US Senate.

1. The US Congress must give the Department of Homeland Security permanent and continuing authority to regulate chemical security in the United States. However, the requirement for facilities to evaluate and/or implement inherent safety options should be carefully examined. Whenever considered, inherent safety options and technologies should be thoroughly examined and based on a system's life cycle analysis (including dismantling) and review of practical risk reduction. Implementation of inherent safety options should not be allowed to create other unintended consequences, risk migration/transfer, or risk accumulation.

2. Inherent safety options can and should be considered; however, we must be aware of the differences in implementing inherent safety options for existing plants, as compared to new plants. Because inherent safety options are best addressed early in a facility's design phase, there are far fewer opportunities to implement inherent safety options in existing plants. In this regard, one can appreciate the differences between starting with a clean piece of paper versus working with an existing facility and the associated equipment.

3. In some cases, a seemingly clear choice with regard to inherent safety may create undesired and unintended consequences. Issues such as risk migration, reduction of overall risk, and practical risk reduction should be evaluated whenever an inherent safety option is considered.

4. Cost-benefit analysis of inherent safety options is another very important and pertinent issue that should be a significant part of any decision making process.

5. Currently there does not exist a generally accepted understanding on the definition of "inherently safer technology." Given that background, if regulations require all plants to be "inherently safe," there might be a tendency to broaden the definition of "inherently safe," so that almost everything fits the definition.

6. I feel very strongly that science should precede regulations and standards. In this respect, I draw the attention of the US Senate to the science and research needs I indentified in my December 12, 2007, testimony to the US House of Representatives. I do not believe that science currently exists to quantify the degree of inherent safety. In other words, there is no clearly established scientific basis on which inherent safety options could be mandated by any legislation or regulation at chemical facilities.

7. The use of a risk-based approach and risk-tiers in evaluating the vulnerability of any facility is a good approach. However, based on current know-how and science, there does not exist any widely accepted scientific process by which to require (by legislation or regulation) a mandatory assessment of "inherently safer technology," at a chemical facility. As a result, there are dangers associated with mandating a specific assessment model or requiring an overly burdensome assessment regime.

8. There are many methods available to the industry for potentially reducing risk and vulnerability. Vulnerability assessments should consider the feasibility of all methods for improving security to determine the methods to achieve the optimum balance of cost-effectiveness and vulnerability reduction. Instead of prescriptive requirements for inherently safer technology and approaches, facilities should be allowed the flexibility of achieving a manageable level of risk using a combination of safety and security options. For example, nuclear facilities have inherently hazardous materials, but they protect their sites and the public with a combination of multiple layers of security and safety protective features.

9. Before adopting any regulatory framework requiring the evaluation and/or implementation of inherently safer technology, significant research questions must be

answered to reach a universally accepted definition of "inherently safer technology." Research in critical areas such as system reliability and resilience must also provide information to help develop appropriate guidance for facilities, both new and old, regarding methods to assess the costs, benefits, and potential risks of process changes at their facilities and throughout the supply chain and market.

Summary

I applaud the US Congress for providing leadership in this important area of chemical security. I strongly urge the US Congress to reauthorize the existing Chemical Facility Anti-Terrorism Standards. It is clear that many companies are taking reasonable and responsible steps in chemical security, including the consideration of inherent safety options. Inherently safer technology is an objective that should continually be pursued, but must always be based upon sound science as well as sound risk assessment and management principles. Mandating the evaluation and/or implementation of inherent safety options must be based on good science. Before such steps can be taken, important issues must be resolved such as a generally accepted understanding on the definition of "inherently safer technology," methods for quantification of inherent safety, and methods for evaluation of inherent safety options. I do not believe that current know-how and science exists to adequately define and quantify any of these issues.

Requirements for inherently safer technology should be based upon good science aimed at making the industry secure, avoid over-regulation, and create a level playing field. US facilities could be at a competitive disadvantage if required to implement unproven technologies simply to meet a regulator's position that such technology is more inherently safe.

I am encouraged by the leadership of Congress and by continued efforts to seek expertise and opinion from all stakeholders.

Before the

SUBCOMMITTEE ON TRANSPORTATION SECURITY AND
INFRASTRUCTURE PROTECTION
OF THE
COMMITTEE ON HOMELAND SECURITY
UNITED STATES HOUSE OF REPRESENTATIVES

Statement of

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On

U.S. Department of Homeland Security's Chemical Facility Anti-Terrorism Act of 2008

Wednesday, December 12, 2007

Introduction

Chairwoman Jackson Lee, ranking member Lungren and members of the Subcommittee, my name is M. Sam Mannan and I hold a BS, MS, and PhD in chemical engineering. I am a registered professional engineer in the states of Louisiana and Texas and I am a certified safety professional. I am a Fellow of the American Institute of Chemical Engineers and a member of the American Society of Safety Engineers, the International Institute of Ammonia Refrigeration, and the National Fire Protection Association. I am Director of the Mary Kay O'Connor Process Safety Center, holder of the T. Michael O'Connor Chair I in Chemical Engineering, and Professor of Chemical Engineering at Texas A&M University. The Center seeks to develop safer processes, equipment, procedures, and management strategies that will minimize losses in the process industry. My area of expertise within the chemical engineering discipline is process safety. I teach process safety engineering both at the undergraduate and graduate level. I also teach continuing education courses on process safety and other specialty process safety courses in the United States and overseas. My research and practice is primarily in the area of process safety and related subjects. The opinions I present today both in my written statement and oral testimony represent my personal position on these issues. These opinions are based on my education, experience, and training.

First, I want to thank this Committee and the US Congress for addressing Chemical Facility Anti-Terrorism and giving the Department of Homeland Security the necessary authority to regulate security in the chemical industry. I applaud the Subcommittee for holding today's hearing on chemical security regulations and their impact on the public and private sector. This is a subject that is of extreme importance to our nation, and I am pleased to be able to share my experience and opinion as well as continue to serve as a resource to the federal government on this important issue.

Background

Hazardous materials can be grouped into three tiers of vulnerability categories. The first category includes the stationary facilities that are members of major industry associations. Even though these facilities have large inventories of hazardous materials and are quite visible, they are the best prepared against attack because of voluntary programs that have been developed and implemented. The second tier of vulnerability category includes smaller and medium-sized facilities that manufacture or use chemicals but may or may not be members of any industry associations. These facilities are less visible, but are also, in general, less prepared and more widely distributed. Finally, the third category of vulnerability includes all hazardous materials that are in transit (by whatever means) throughout the United States. In addition to being present almost anywhere in the United States at any given time, this category also represents high visibility and the highest vulnerability. It could also be argued that this category is the least prepared to deal with intentionally caused catastrophic scenarios.

Some pertinent subjects of interest with regard to attacks on the chemical infrastructure are: active protection measures; passive protection measures; vulnerability analyses, response and recovery plans; and long-term needs and priorities. Active protection measures include increased security, limited access to facilities, and background checks. Examples of passive protection measures include development of exclusion areas and process and engineering measures.

Vulnerability analysis, response, and recovery plans are needed not only to help devise the prevention and protection plans, but also to develop the response and recovery plans. In this respect, it must be mentioned that most of the large, multi-national facilities that are members of major industry associations have voluntarily conducted some form of vulnerability analysis. What is not clear is whether these analyses have been used to integrate planning for response and recovery efforts in coordination with local agencies and the public. One very stark lesson from the 9/11 events is that the "first" first-responders are usually members of the public. Additionally, area- and region-specific vulnerability analysis and assessment of infrastructure availability for response and recovery have not been conducted. Finally, a national vulnerability analysis and assessment of infrastructure availability for response and recovery is a critical need.

Whether natural or man-made, disasters will continue to happen. However, as we have seen with the 9/11 events, hurricanes Katrina and Rita, and chemical incidents such as the Bhopal disaster, planning and response is crucial in being able to reduce the consequences and to recover from the disaster more rapidly. In this regard, it is essential to conduct vulnerability analysis, response, and recovery planning at the following three levels:

- **Plant-specific vulnerability analysis** and assessment of infrastructure availability and preparedness for response and recovery is needed. As mentioned earlier, most of the large multi-national facilities that belong to prominent industry associations have voluntarily conducted some form of vulnerability analysis. What is not clear is whether these analyses have been used to integrate planning for response and recovery efforts in coordination with local agencies and the public.

- **Area- and region-specific vulnerability analysis** and assessment of infrastructure availability for response and recovery should be conducted. Each area- and region-specific analysis should include an assessment and planning for evacuation and shelters.

- **National vulnerability analysis** and assessment of infrastructure availability for response and recovery is critically needed. In doing this national analysis, impact on international issues and criteria should also be considered.

Long-term Goals and Priorities

Long-term goals and priorities to prevent and/or reduce the consequences of intentional catastrophic scenarios require clear thinking and hard work. While no one would argue that making hazardous materials less attractive as a target should be a goal that all stakeholders should accept, differences arise in how we realize that goal.

Inherent safety options can and should be considered; however, we must be aware of the differences in implementing inherent safety options for existing plants, as compared to new plants. Also, in some cases, a seemingly clear choice with regard to inherent safety may create some undesired and unintended consequences. Issues such as risk migration, reduction of overall risk, and practical risk reduction should be evaluated whenever an inherent safety option is considered.

Another long-term goal is to develop technology and know-how with regard to resilient engineered systems and terrorism-resistant plants. In this respect, research and technological advances are needed in many areas, such as bio-chemical detection, sensors, and self-healing materials. Protection of the chemical infrastructure, like many other challenges, requires the commitment and effort of all stakeholders.

I feel very strongly that science should precede regulations and standards. With regard to science and technology investments, many initiatives have been proposed and are being implemented. However, some important additional initiatives that should also be considered are given below:

1. The fact is that the chemical infrastructure and all components including the individual sites, supply, and delivery systems were never built with terrorism in mind. Research must be conducted to determine how we might have designed and built the chemical plants and the infrastructure had we considered these threats. The ultimate goal for such research would be two-pronged. First, determine options for what can be feasibly implemented for existing plants. Second, if necessary, prescribe new standards and procedures for new plants.

2. Research investments should be made on advanced transportation risk assessment methods. Before transportation of any hazardous materials, a transportation risk assessment should be conducted using available information and methodology, as well as time-specific data that may be available.

3. Additional science and technology investments that should be considered are:

    - Development of incident databases and lessons learned. This knowledge base could then be used to improve planning, response capability, and infrastructure changes. Recent experience in this regard is the improvement in planning and response for the hurricane Rita from lessons learned from the hurricane Katrina.

- Research should be conducted on decision-making, particularly under stress, and how management systems can be improved.

- Research on inherent safety options and technologies. This type of research should be combined with systems life cycle analysis and review of practical risk reduction. In other words, implementation of inherent safety options should not be allowed to create other unintended consequences, risk migration, or risk accumulation. While transportation is outside the scope of the ***Chemical Security Act of 2008***, it must be included in vulnerability assessments to avoid transfer of facility risks to transportation risks.

- Basic and fundamental research is also needed on design of resilient engineered systems. For example, if the collapse of the World Trade Center towers could have been extended by any amount of time, additional lives could likely have been saved.

- Basic and fundamental research is also needed on resilient and fail-safe control systems.

- Long-term research is also needed in the area of self-healing materials and biomimetics.

Specific Comments on the ***Chemical Security Act of 2008***

With regard to the ***Chemical Security Act of 2008***, I have the following specific comments:

1. The US Congress must give the Department of Homeland Security permanent and continuing authority to regulate chemical security in the United States. While many facilities are voluntarily taking appropriate measures, I am concerned that many are not. A regulation that creates a minimum and level playing field is very important.

2. The inclusion of water processing facilities in the *Act* is important and necessary. As the 9/11 events have shown, terrorists are more likely to use easily available materials to strike at us.

3. The use of a risk-based approach and risk-tiering in evaluating the vulnerability of any facility is a good approach.

4. Although Section 2110 of the ***Chemical Security Act of 2008*** does not refer to the term "inherent safety" or "inherently safer technology," compliance with Section 2110 deals exclusively with the implementation of inherently safer technologies and approaches. I have several comments with regard to the proposed language in the *Act*.

a. It is not clear how the Secretary would determine what is an inherently safer technology or approach. More clarity is needed on this issue.

b. There are many methods available to the industry for potentially reducing risk and vulnerability. Vulnerability assessments should consider the feasibility of all methods for improving security to determine the method to achieve the optimum balance of cost effectiveness and vulnerability reduction.

c. As I stated earlier, science should precede regulations. I do not believe that the science currently exists to quantify inherent safety. This *Act* or any actions taken as a result of the *Act* should not create unintended and unwanted consequences. An example in this context is the substitution of hydrogen fluoride (HF) with sulfuric acid (H_2SO_4) for refinery alkylation processes. While it is true that HF is more toxic than H_2SO_4, the amount of H_2SO_4 needed to do the same amount of processing is 25 times or more than HF. Thus changing from HF to H_2SO_4 would require large storage facilities and more transportation. In fact, changing from HF to H_2SO_4 may provide more opportunities for a terrorist attack. On the other hand, a well-managed plant with a smaller amount of HF and appropriate safety protective systems may represent a lower overall risk.

d. While there is no question that options with regard to inherent safety should be considered, we must understand and account for the challenges and difficulties in implementing inherently safer technology and options. In this context, the Mary Kay O'Connor Process Safety Center published a White Paper outlining challenges faced in evaluating and implementing inherently safer designs (the White Paper is provided as an attachment). The first challenge is simply to measure the degree of inherent safety in a way that allows comparisons of alternative designs, which may or may not increase safety or may simply redistribute the risk. The second is that because inherent safety is an intrinsic feature of the design, it is best implemented early in the design of a process plant, while the US has a huge base of installed process plants and little new construction. Finally, in developing inherently safer technologies, there are significant technical challenges that require research and development efforts. These challenges make regulation of inherent safety very difficult. We believe that a coordinated long-term effort involving government, industry, and academia is essential to develop and implement inherently safer technologies. A similar collaborative approach has shown success in related areas such as green chemistry, energy conservation, and sustainable development.

e. Instead of prescriptive requirements for inherently safer technology and approaches, facilities should be allowed the flexibility of achieving a manageable level of risk using a combination of safety and security options. For example, nuclear facilities have very high hazard materials, but they protect their site and the public with a combination of multiple layers of security and safety protective features. The current language in the bill is far too prescriptive and focused much too heavily on only one method of reducing the consequences of a terrorist attack. All methods of reducing vulnerability should be considered on a case-by-case basis, and the implementation of any one particular method should not take or appear to take precedence over the others.

f. Over the past 10-15 years, and more so after 9/11, consideration of Inherently Safer Technology (IST) options and approaches has effectively become part of industry standards, with the experts and persons with know-how assessing and implementing inherently safer options, without prescriptive regulations that carry risks (both as trumping other tools or potentially shifting risk). A better approach for applying IST in security is by allowing the companies to assess IST as part of their overall safety, security and environmental operations and therefore, cannot be prescriptive. The current DHS regulations allow for IST - but do not require it under the performance-based standards and the no "one-measure" language proposed in the ***Chemical Security Act of 2008***. Any new law should adopt the current comprehensive regulatory scheme and build upon the great effort and momentum already established.

5. The section of the *Act* dealing with the formation of the *Panel on Methods to Reduce the Consequences of a Terrorist Attack* is in principle a good idea. However, an issue that needs to be given some thought is trade secrets. Even though the *Act* contains requirements with regard to protection of information and confidentiality of documents, it stands to reason that companies may feel restricted in providing certain trade secret information when they know that such information may be viewed by panelists who are employees of other companies and competitors. Another issue is that the panel could well be faced with a huge volume of work. There are thousands of different chemical processes in use in the US. What works at one facility is not necessarily appropriate at another facility, even if they have the same feedstock and product.

6. The numerous uses of the word "any" could create a huge amount of workload associated with the evaluations and documentation of site vulnerability assessments (SVA) with little benefit. For example, page 12, "The identification of any hazard that could result from a chemical facility terrorist incident at the facility." Another example on page 12 is paragraph E, "Any vulnerability of the facility with respect to___."

7. Paragraph B on page 12 requiring the quantification of consequences ("The number of individuals at risk of death, injury, or severe adverse effects to human health as a result of a chemical facility terrorist incident at the facility.") should be removed or modified. As was the case with the RMP "Population at Risk" values, the data are often taken out of context or used inappropriately. Furthermore, there will be significant variability in how these estimates are calculated if performed by each company. It would be much better to have these estimates generated by DHS based

upon the inventories provided by the companies, as is the case with current DHS regulations.

8. Regarding SEC. 2110, section (a) METHODS TO REDUCE THE CONSEQUENCES OF A TERRORIST ATTACK, it is not clear how item (5) '*procedure simplification*', or (10) '*reduction of the possibility and potential consequences of equipment failure and human error*', would have an impact upon the consequences of a terrorist attack.

Concluding Thoughts

I applaud the US Congress for providing leadership in this important area of chemical security. It is clear that many companies are taking reasonable and responsible steps in chemical security. However, all facilities that handle, store, or transport hazardous materials should be required to take such steps. That is why government must develop and enforce good-science based regulations that set the minimum and necessary standards for chemical security. These regulations should be based upon good science aimed at making the industry secure, avoid over-regulation, and create a level playing field.

Terrorism should not only be expected from Al-Qaeda and its support organizations, but from other sources as well, both home-grown and foreign. In this respect, planning and response measures should be based upon considering not only the existing structure of Al-Qaeda and its support organizations, but also the looming threat of mutations of Al-Qaeda and other terrorist organizations. As the Oklahoma City bombing and the more recent London events have shown, the terrorists could very well be our own citizens. As the mutation keeps evolving, it is not unlikely that alliances would develop among Al-Qaeda type organizations and other organizations or individuals who are disaffected or anti-establishment for totally different reasons. In fact, these organizations may be at odds with each other ideologically, but may unite because they see the establishment as a common enemy.

Regardless of what steps are taken by government, industry and other stakeholders regarding chemical security, it stands to reason that a terrorist attack should be expected and will occur sooner or later. As we know now, the 9/11 attacks were in planning for several years. As the adage goes, the terrorists only have to be successful once. Thus, it is imperative that the approaches taken be based upon the triple-pronged philosophy: evaluation and assessment, prevention and planning, and response and recovery. Planning and preparedness is required for all three areas.

In closing, only through a comprehensive, uniform and risk-based approach can we protect the people and communities of our nation as well as protect our nation's critical chemical infrastructure. I am encouraged by the leadership of Congress and the continued effort to seek expertise and opinion from all stakeholders.

Thank you for inviting me to present my opinions and I will be happy to answer any questions.

Attachment to the

Statement of

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SUBCOMMITTEE ON TRANSPORTATION SECURITY AND INFRASTRUCTURE PROTECTION
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On

U.S. Department of Homeland Security's Chemical Facility Anti-Terrorism Act of 2008

Wednesday, December 12, 2007

Challenges in Implementing Inherent Safety Principles in New and Existing Chemical Processes

White Paper

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Abstract

This paper defines inherent safety and contrasts it with more traditional approaches to safety. It illustrates through analogies with common household examples the challenges faced in evaluating and implementing inherently safer designs. The first challenge is simply to measure the degree of inherent safety in a way that allows comparisons of alternative designs, which may or may not increase safety or may simply redistribute the risk. The second is that because inherent safety is an intrinsic feature of the design, it is best implemented early in the design of a process plant, while the US has a huge base of installed process plants and little new construction. Thirdly, in developing inherently safer designs, there are significant technical challenges that require research and development efforts with limited economic incentives. These challenges make regulation of inherent safety very difficult. We believe that a coordinated long-term effort involving government, industry, and academia is essential to develop and implement inherently safer designs. A similar approach has shown success in related areas such as green chemistry, energy conservation, and sustainable development.

[redacted] [redacted] **White Paper:**

Challenges in Implementing Inherent Safety Principles in New and Existing Chemical Processes

What is Inherent Safety?

Inherent safety is based on the use of technologies and chemicals with intrinsic properties that reduce or eliminate hazards. Inherent safety is based on concepts known for more than 100 years (Kletz, 1998) and is an approach to chemical incident and pollution prevention that is in some ways contrary to traditional accident prevention and mitigation methods. Traditional safety practices typically reduce risk by lowering the probability of an incident and/or mitigating the consequences of an incident. This approach alone, although extremely important and generally effective, does not reduce the hazards of serious chemical incidents because it attempts to control hazards rather than eliminate them. Inherent safety is especially important in today's world where terrorists may cause a chemical release by methods that bypass or defeat normal safety systems.

The concepts of inherent safety as applied to chemical process plant design has been discussed elsewhere (Mannan et al., 2002) and are summarized below:

> **Intensification or minimization** consists of reduction of quantities of hazardous chemicals in the plant. "What you don't have can't leak".
>
> **Substitution** is the use of a safer material in place of a more hazardous one. It may be possible to replace flammable substances with non-flammable ones or toxic substances with non-toxic ones. However, it is necessary to evaluate not only the substance but also the volumes required.
>
> **Attenuation** or moderation is the use of a hazardous chemical under less severe conditions such as lower pressure or temperature. Thus chlorine and ammonia are stored as refrigerated liquids at atmospheric pressure rather than at high pressure at ambient temperature. The lower pressure results in lower leak rates and the lower temperature lowers the vaporization rate.
>
> **Limitation of effects**, by changing designs or process conditions rather than by adding on protective equipment that may fail. For example, it is better to prevent overheating by using by using a fluid at a lower temperature rather than use a hotter fluid and relying on a control system.
>
> **Simplicity**: Simpler plants are safer than complex plants as they provide fewer opportunities for error and contain less equipment that can fail.

Other principles such as, making assembly errors impossible, and avoiding knock-on effects are also inherently safer design concepts.

One of the most common accidents at home is falling on the stairs. A home without stairs, i.e. a one-story bungalow, is inherently safer with regard to falling on stairs than a two-story house. Even if the stairs are equipped with handrails, non-slip surfaces, good lighting, and gates for children, the hazard is still present (Kletz, 1998). Obviously the choice of an inherently safer house implies positive and negative consequences, which may include aesthetics, cost, and other types of hazards. An elevator could reduce the use of stairs but requires a large capital expense. During construction there would be significant hazards to the residents and construction workers and the stairs would still be necessary for emergency egress. Few families would conclude that installing an elevator is the best use of their resources.

Measuring Inherent Safety

While inherent safety is based on well-known principles, difficulties have been encountered in adopting the principles as a routine practice by industry. One of the first problems encountered during application of inherent safety principles is the subjectivity involved. The principles are descriptive rather that prescriptive, hence they are subject to interpretation based on previous experience, knowledge, and personal perception. A consequence of the subjectivity is that a systematic methodology to measure inherent safety does not exist, and it is not currently possible to know how inherently safe a plant or an equipment item is because it is not possible to evaluate how well the principles have been applied. If we cannot measure how inherently safer the one story condo is with respect the two-floor house, how can we choose the inherently safer option?

Several measurement and analysis tools have been proposed during the last few years, but in general they focus on specific aspects of the problem during a specific time in the plant lifecycle and are difficult to apply. Besides the lack of measurement methodology, inherent safety cannot be applied in the same way for existing productive plants as for new facilities during the design stage. Existing equipment and processes impose restrictions on changes towards inherently safer technologies that might be implemented in an operating facility. For instance it is not possible to turn a two-story house into a bungalow without an extremely expensive modification. However, other smaller changes can be implemented to obtain an inherently safer house even if not so safe as the bungalow. Some types of staircases are safer than others, e.g., short high steps are inherently more hazardous than long low steps. Very low single steps are easy to be undetected and cause accidents. Thus the possible solutions could be to avoid single small steps and to use staircases with low and long steps or (as suggested by Kletz) with frequent landings to reduce the distance and height of a possible fall.

Evaluating and Comparing Design Options

The cost of applying inherent safety to existing facilities may require significant financial resources but may also unintentionally cause an increase in risk if it is implemented without a holistic view of the plant. A chemical plant is a complex collection of intricate and interconnected equipment, pipes, vessels, and instruments containing a variety of chemicals. When a modification is made in one part of the plant, other areas will be affected, requiring other changes in other parts of the plant. If the safety impact of this cascade of changes into other areas is not understood during the evaluation of the original change toward an inherently safer plant, the final result could be a less safe plant! A common example is the possible substitution of a hazardous chemical substance, used in small amounts, by another one that is more benign but is required in much larger amounts. In this case it is difficult to evaluate which chemical is actually the inherently safer option, because aspects such as transportation, storage, and modification of the plant to work with the new chemical must be included in the evaluation. There must be a systematic assessment and minimization of all hazards together rather than one at a time to avoid the appearance of unidentified hazards. Application of inherent safety principles to operating plants is possible (Hendershot, 1997) but implementation is subject to constraints dictated by technical and economic factors.

The implementation of inherent safety for new plants is simpler and cheaper because the design exists only on paper since nothing has been built yet. However, since many inherently safer options may be available and because a systematic analytical methodology is not available, application of the inherent safety principles is still restricted. Also, inherent safety is not absolute, it is site and plant specific. For instance a two-story house may be safer than a bungalow when located in an area threatened by frequent flooding. Therefore, a solution that can be inherently safer for one plant may not be the best option for the same plant in another location with a different environment.

The application of inherent safety requires subjective judgment and tradeoffs among several factors. Furthermore, the selection and use of inherently safer technology does not guarantee by itself that a plant will result in safer operation among its complex and interrelated systems. For instance, a sick person with lung, heart, and digestive problems can take the best medicine for each sickness, however the interaction of those drugs may have catastrophic results rather than a positive therapeutic effect.

The objective of inherent safety is to remove or reduce hazards. The inherently safest case is the one with zero hazards, but this is a limiting and unachievable case. Everyday life is plagued with hazards that are intrinsic to our society. Removing all the hazards is not possible. The situation of a chemical plant is very similar, and therefore we can only aspire to design inherently safer plants. It will be necessary to apply other methods to control the remaining hazards. Therefore, it is still possible for incidents to occur but their consequences are reduced.

It may also be true that it is really not possible to judge which of two options is inherently safer. For instance solvent A is toxic but not flammable, solvent B is flammable but not toxic. There may be no "right" answer. Also, the answer may depend on one's point of view. A plant can use chlorine from 1-ton cylinders or from a 90-ton rail car. To the operator who has to connect and disconnect cylinders several times a day the rail car is inherently safer. To a neighbor several miles away the cylinders are safer, they do not contain enough material to affect him.

When new knowledge about chemical hazards or new technology is available, our understanding of the inherent safety of a specific plant can change. An example of this change is the adoption of CFC refrigerant gases (Hendershot, 1995) that are not flammable or toxic compared with ammonia, which was previously used. It has been theorized (and widely accepted) that they destroy the earth's ozone layer and our judgment of the inherent safety of CFC refrigerants relative to other materials are radically changed. Inherent safety is therefore a dynamic, subjective, and holistic concept that requires specific measurement and analytical tools to evaluate. However, these tools are under development and at present are not available for general use. Without these analytical tools it is very difficult if not impossible to impose restrictions, limits, and regulations to improve inherent safety.

Inherent Safety can also be misused when decisions are subjective and based on limited aspects without possibility of a methodical analysis. For instance, a plant requiring a specific raw material transported by rail can decide to improve the degree of inherent safety by reducing the inventory of that hazardous chemical. Changing the mode of transportation to truck results in a smaller shipment (and a smaller inventory) but it also triples the shipment frequency. Thus the total plant inventory is kept low but the remainder of the inventory is on wheels traveling from the supplier's plant to the user's plant. This example also shows an inherent safety complication that extends outside the plant boundaries and represents an incorrect application of inherent safety that cannot be detected without a measuring tool and without analyzing the plant as a global system. In this case it is inherently safer to maintain the large inventory inside the plant and, as suggested by Kletz (1998), keep it under control by using good design and operating practices that follow other concepts of inherent safety (e.g., keep the design simple to avoid errors).

Progress to Date

We believe that many chemical plants have adopted the easiest and most obvious improvements, such as reviewing chemical inventories and reducing them when it is practical. This improvement is a natural outcome of the Process Hazard Analysis that has been required of most major facilities for the last 10 years.

Less hazardous solvents have been developed and are in use in some processes (Crowl, 1996). Plants using hydrofluoric acid can now use an additive that reduces the dispersion of this chemical during a release. These developments however, required substantial time and cost to develop, test, and implement. Many significant advances are possible but they too will require research, development, and implementation over a long time period. As shown above, the development of methods to measure the inherent safety of various process options is an essential first step to the widespread implementation of inherently safer designs. The Mary Kay O'Connor Process Safety Center is currently developing a method to measure inherent safety using fuzzy logic mathematics.

Moving Forward

Regulation to improve inherent safety faces several difficulties. One, there is not presently a way to measure inherent safety. Two, the complexity of process plants essentially prevents any prescriptive rules that would be widely applicable. At most it would seem that legislation could explicitly require facilities to evaluate inherently safer design options as part of their process hazard analysis, but inherent safety would be almost impossible to enforce beyond evaluation because of unavoidable technical and economic issues.

Government programs now support the research and development of concepts such as "green chemistry", "solvent substitution", "waste reduction" and "sustainable growth", which are related to inherent safety. A similar approach involving industry, government, and academia can enhance the discovery, development, and implementation of inherently safer chemical processes.

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Post-Hearing Questions for the Record
Submitted to the Honorable Rand Beers
From Senator Mark L. Pryor

"Chemical Security: Assessing Progress and Charting a Path Forward"
March 03, 2010

Question#:	1
Topic:	efforts
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Mark Pryor
Committee:	HOMELAND SECURITY (SENATE)

Question: Efforts in the chemical security program are focused on deterring or preventing a terrorist attack at a covered facility. While it is appropriate to work hard to prevent an attack, it is also important to address what should happen if an attack on a covered facility were to succeed. I am particularly interested in the efforts of facilities to assist employees and other individuals that have been exposed to dangerous chemicals.

What has the Department done to ensure that covered facilities have the capability to utilize decontamination and neutralization resources in the event of a chemical release?

What has DHS done to ensure facilities are aware of the variety of resources for decontamination?

Response: As noted in the question, the Department of Homeland Security's (DHS's) regulatory authority over chemical facility security, the Chemical Facility Anti-Terrorism Standards (CFATS), is focused on deterring and preventing a terrorist attack at a covered (i.e., high-risk) chemical facility. CFATS does, however, require covered facilities to develop and exercise plans regarding how to respond to a terrorist attack. Each covered facility must submit for DHS approval a Site Security Plan (SSP) – or an Alternative Security Program (ASP) in lieu of an SSP – that meets certain Risk-Based Performance Standards (RBPSs) laid out in CFATS. Specifically, RBPS 9 (Response) requires covered facilities to "develop and exercise an emergency plan to respond to security incidents internally and with assistance of local law enforcement and first responders."

In accordance with the statutory authority for CFATS, DHS cannot require a covered facility to take any specific measures or actions in its SSP (or ASP). The Department has, however, provided detailed guidance to covered facilities on potential measures that could satisfy the RBPS. In the section of the *RBPS Guidance Document* focused on

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Topic:	efforts
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Primary:	The Honorable Mark Pryor
Committee:	HOMELAND SECURITY (SENATE)

RBPS 9 (Response), DHS indicates that facilities should consider, among other things, developing and exercising a comprehensive crisis management plan (to include emergency response plans and evacuation plans); adopting procedures for safe shutdown in an emergency; and conducting an active outreach program to the community and local law enforcement and emergency responders that includes participation in local emergency planning committees, community hazards emergency response – capability assurance processes, and similar groups. As part of these activities, it is anticipated that many covered facilities will have evaluated decontamination and neutralization resources available in their community.

Additionally, as part of the CFATS program, DHS has undertaken a Response Capability versus Response Need (RCRN) pilot program in two communities through which the Department brings together covered facilities and the local response community to catalog response capabilities within the jurisdiction and evaluate those capabilities against the needs identified at the covered chemical facilities. Through this pilot program, the Department intends to help facilities understand the resources available to them in case of a successful attack while also working collaboratively to evaluate whether or not the community has the proper resources to handle a successful attack at a facility within the community.

Post-Hearing Questions for the Record
Submitted to the Honorable Rand Beers
From Senator Lindsey Graham

"Chemical Security: Assessing Progress and Charting a Path Forward"
March 03, 2010

Question#:	2
Topic:	CFATS rules
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: It is my understanding that the CFATS rules (6 CFR Part 27) provides several ways for a facility initially determined to be high-risk to question that determination or its preliminary risk-based tiering assignment. Specifically, I understand Section 27.120(c) allows any high-risk facility to request a consultation or seek technical assistance from the DHS CFATS Coordinating Official on any relevant matter under CFATS.

Section 27.120 (c) states:

(c) In order to initiate consultations or seek technical assistance, a covered facility shall submit a written request for consultation or technical assistance to the Coordinating Official or contact the Department in any other manner specified in any subsequent guidance. Requests for consultation or technical guidance do not serve to toll any of the applicable timelines set forth in this Part.

Please describe in detail the process used by DHS to inform a covered facility of their rights under 6 CFR Part 27. Is there a standard form used to explain to a covered facility their rights, including but not limited to the process for requesting a consultation and submitting an Application of Review under Section 27.305? What information does that form contain? Does it explain in detail the process by which the covered facility may request a consultation or technical guidance from the DHS CFATS Coordinating Official?

Please describe the service of process method used by DHS to notify a covered facility of their right to contest a designation or other ruling by the Assistant Secretary. Is the covered facility informed of their rights by registered mail? If not, what other process is used?

Question#:	2
Topic:	CFATS rules
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Response: Information on how to comply with or use the procedures provided by the Chemical Facility Anti-Terrorism Standards (CFATS) is available through multiple methods and media. For example, the Department of Homeland Security (DHS) conducts numerous CFATS-related public outreach events, webinars, and meetings on a routine basis, which serve as a direct line for facilities and members of the public to ask questions or receive referrals to additional sources of information, such as written, electronic, or personal support services. In terms of electronic or written media, DHS has developed a CFATS website, located at www.dhs.gov/chemicalsecurity, which provides hundreds of searchable answers to frequently asked questions (FAQs), arranged topically. Among these, FAQ # 1557 specifically addresses the issue of requests for redetermination and requests for consultations or technical discussions.

If a facility has further questions, the Department has established a CFATS Help Desk that provides information about all aspects of CFATS, including redeterminations and technical consultations. This Help Desk operates Monday-Friday from 7 a.m. to 7 p.m. Eastern Time and is accessible via both a toll-free telephone number and email. In 2008 and 2009, the Help Desk responded to 26,386 and 14,139 total calls and emails, respectively. Calls about redetermination requests, technical consultations, risk-based tiering determinations, and material modifications numbered 1,926 in 2008 and 1,004 in 2009. Thus far in 2010, the Help Desk has handled 4,289 total calls and emails, 389 of which were on one or more of these topics. Answers always include not just explanations of the CFATS Rule but also any applicable mailing addresses for a site needing to contact DHS directly.

In addition to the Help Desk, any facility may call upon its local Chemical Facility Inspector for assistance in answering questions or understanding CFATS. If a facility does not know its local Inspector, the Help Desk and DHS website accept and forward requests for contact.

Question#:	3
Topic:	coordinating official
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: Section 27.120 (a) states that:

(a) The Assistant Secretary will designate a Coordinating Official who will be responsible for ensuring that these regulations are implemented in a uniform, impartial, and fair manner.

Fairness requires that the covered facility be informed of how they may petition the Coordinating Official for the purposes of upholding their rights.

Does the notice given by DHS informing the covered facility of their rights under this section include the name, address, and any other relevant contact information of the Assistant Secretary's designated Coordination Official under Section 27.120(a)?

Response: Information on how to contact the Coordinating Official is available through multiple methods and media. For example, the Department of Homeland Security (DHS) conducts numerous Chemical Facility Anti-Terrorism Standards (CFATS)-related public outreach events, webinars, and meetings on a routine basis, which serve as a direct line for facilities or members of the public to ask questions or receive referrals to additional sources of information, such as written, electronic, or personal support services. In terms of electronic or written media, DHS has developed a CFATS website, located at www.dhs.gov/chemicalsecurity, which provides hundreds of searchable answers to frequently asked questions (FAQs) arranged topically. Among these, FAQ # 1557 provides the address and means to contact both the Assistant Secretary for Infrastructure Protection and the CFATS Coordinating Official:

> Please note that requests for consultation or technical assistance under Sec. 27.120(c) or (d) and Requests for Redetermination under Sec. 27.205(b) do not stay or extend any deadlines under the rules (e.g., Security Vulnerability Assessment deadline) applicable to your facility. If you wish to request an extension of any applicable deadline, you should submit such a request in writing, with any supporting explanation or justification, to: Mr. Todd M. Keil, Assistant Secretary for Infrastructure Protection, Department of Homeland Security. Please send the request c/o Dennis Deziel, Infrastructure Security Compliance Division, MS 8100, Dept. of Homeland Security, Washington, DC 20528. If you have any questions about your SVA

Question#:	3
Topic:	coordinating official
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

deadline or other CFATS issues, please contact the DHS CSAT helpdesk at 866-323-2957.

If a facility would prefer more individualized assistance or has further questions, the Department has established a CFATS Help Desk that provides information about all aspects of CFATS including how to request a meeting with the Coordinating Official. This Help Desk operates Monday-Friday from 7 a.m. to 7 p.m. Eastern Time and is accessible via both a toll-free telephone number and email. Answers always include not just explanations of the CFATS Rule but also any applicable mailing addresses for a site that needs to contact DHS directly.

Facilities may also contact Chemical Security Inspectors for answers to any question regarding the Rule, including how to contact the Assistant Secretary and Coordinating Official.

Question#:	4
Topic:	covered facilities
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: Section 27.120(b) states that:

(b) The Coordinating Official and his staff shall provide guidance to covered facilities regarding compliance with this Part and shall, as necessary and to the extent that resources permit, be available to consult and to provide technical assistance to an owner or operator who seeks such consultation or assistance.

Many of the covered facilities subject to 6 CFR Part 27 will be required to spend limited resources to implement security plans and come into compliance with this Rule. These covered facilities will also have resource constraints. They will be competing in the global market place with foreign competitors who may not have to comply with the federal mandates that arise under the CFATS program.

Therefore, it is critical that covered facilities have access to technical guidance from DHS that can help them meet security objectives of 6 CFR Part 27 at the lowest cost feasible so that the covered facility can remain competitive in the global marketplace. DHS has a responsibility to assist covered facilities by helping them reduce the burdens of meeting the requirements of this rule. Has the DHS ever denied guidance to a covered facility or turned down an invitation for a site visit based on resource constraints? When a consultation takes place, does the DHS staff provide any guidance on what actions a covered facility could take to reduce its assessed risk level?

Please explain how DHS balances security needs with economic constraints. Does DHS have officials in the CFATS program with specific economic or business expertise? What kind of cost-benefit analysis does DHS engage in implementing 6 CFR Part 27?

With respect to making determinations under Subpart B of Part 27, to what extent are the resource limitations of a covered facility taken into account in developing a site security plan? Does DHS have specific staff assigned to work with the covered facility to advise the covered facility on measures the facility could take to limit its risk profile so as to meet the security requirements of Part 27 but in the most cost-efficient way?

Response: The Department has Chemical Security Inspectors and other subject-matter experts (including chemists, chemical engineers, general engineers, physical security specialists, and cybersecurity specialists) who engage covered (i.e., high-risk) chemical facilities through compliance assistance visits, technical consultations, and other means

Question#:	4
Topic:	covered facilities
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

before and during development of individual Site Security Plans (SSPs) or Alternative Security Programs (ASPs) in lieu of SSPs. Under the statutory authority for the Chemical Facility Anti-Terrorism Standards (CFATS) regulations, the Department cannot disapprove any SSP or ASP based on the presence or absence of any specific security measure. Accordingly, CFATS provides great flexibility to each facility to choose security measures that meet the Risk-Based Performance Standards (RBPS) laid out in CFATS in a way that is appropriate for each facility's unique circumstances. That flexibility can include, among other things, implementing security measures to make the facility less vulnerable to attack, as well as changing or eliminating chemicals or processes to mitigate the source of a security risk.

During compliance assistance visits and technical consultations, the Department may discuss options that a facility is considering that could help it manage or reduce its security risk or the potential consequences from a security incident; however, as the Department is prohibited from requiring facilities to take specific security measures or actions, these are not recommendations or requirements. In addition to individual compliance assistance visits and technical consultations, the Department has developed and made available to the regulated community an RBPS guidance document to help facilities identify and select processes, measures, and activities to address their security risks. This document provides information on the types and combinations of security measures and processes that may satisfy an individual RBPS for a facility at a specific risk-tier level. The Department's ultimate role is to evaluate the approach proposed by the facility to ensure that it has either eliminated the source of the risk or has implemented a security posture that meets the CFATS performance standards and is appropriate for the facility's specific circumstances.

During compliance assistance visits and technical consultations, and during the review of submitted SSPs and ASPs, the Department is willing to discuss with the covered facility the potential cost-benefit of options a facility is considering implementing; however, it is up to the facility to select and propose to the Department the security measures or actions it would like to use to satisfy the RBPSs in its SSP or ASP, which the Department has ultimate authority to approve or disapprove in accordance with the CFATS standards. Of course, each facility is free to choose measures for its plan that are as cost-effective as possible under the facility's individual circumstances. Accordingly, while the Department does have numerous officials with either economics or business backgrounds supporting the CFATS program, the Department does not perform any cost-benefit analysis for the regulated facility. Responsibility for performing any such assessment would be a business decision for the facility.

Question#:	4
Topic:	covered facilities
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

To date, the Department has fulfilled all requests for compliance assistance visits and technical consultations. The Department understands the importance of providing guidance and technical assistance to the regulated community and intends to continue performing timely compliance assistance visits to the extent resources allow. In addition to compliance assistance visits and technical consultations, the Department is continuously engaging in public outreach events, webinars, exercises, and other activities to help covered chemical facilities to identify effective approaches to manage or reduce their security risks.

Question#:	5
Topic:	disagreement
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: There will certainly be cases where a covered facility and DHS are in disagreement such as a disagreement with respect to a Tier determination decision, the structure of a site security plan, or the steps to be taken to implement a site security plan. It is my understanding that DHS has a process in place under this rule whereby a covered facility may request a consultation with DHS. However, there will be cases where DHS and the covered facility continue to disagree, after good faith efforts at consultation.

Please describe the adjudication process whereby the covered facility can present evidence and arguments at a hearing before a neutral adjudicator.

What process does DHS have in place to ensure that the adjudicator is neutral and was not involved in making any initial decision with respect to the covered facility in question? How does DHS ensure there is no conflict of interest? Does a covered facility have the right of discovery to determine how decisions affecting the facility were made? Does a covered facility have the right to call witnesses and give testimony in support of its position? Are the proceedings, including all witness testimony and documents and other exhibits offered in support of the covered facility's position made part of an official case record?

Response: Adjudications under the Chemical Facilities Anti-Terrorism Standards (CFATS) regulations, 6 C.F.R. Part 27, are presided over by a neutral adjudications officer (the Presiding Officer). Pursuant to 6 C.F.R. § 27.315, the Secretary is responsible for appointing the Presiding Officer. To qualify as a Presiding Officer, he or she must be an attorney employed by the Department of Homeland Security (DHS) and must not perform investigative or prosecutorial functions with respect to CFATS. In addition, 6 C.F.R. § 27.320 specifies that Presiding Officers, and any persons who advise Presiding Officers, must not have any *ex parte* communications with any DHS official or representative of such an official who performs a prosecutorial or investigative function related to the proceeding.

Section 27.335 of CFATS describes the procedures for the conduct of hearings whereby the facility or person who sought the adjudication can present witnesses or written testimony as well as other relevant and material information in opposition to the action being challenged. In addition, 6 C.F.R. §§ 27.230(c) and 27.335(b)(3) provide for cross-examination of witnesses if the Presiding Officer decides that any factual issues warrant cross-examination. Section 27.335 also requires that any hearing be recorded verbatim, while § 27.340 requires the Presiding Officer to certify the record upon completion of the adjudication proceedings and to base his or her initial decision on that certified record.

Question#:	6
Topic:	section 27.315
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: My understanding is that, under section 27.315, the Assistant Secretary appoints an adjudicator after a request for review has been submitted by a covered facility. Specifically, section 27.315 states:

(a) Immediately upon the filing of any Application for Review, the Secretary shall appoint an attorney, who is employed by the Department and who has not performed any investigative or prosecutorial function with respect to the matter, to act as a neutral adjudications officer or Presiding Officer for the compilation of a factual record and the recommendation of an Initial Decision for each Proceeding.

(b) Notwithstanding paragraph (a) of this section, the Secretary may appoint one or more attorneys who are employed by the Department and who do not perform any investigative or prosecutorial function with respect to this subpart, to serve generally in the capacity as Presiding Officer(s) for such matters pursuant to such procedures as the Secretary may hereafter establish.

Please describe how the adjudication process works. Does the neutral adjudicator make the final decision or does another official such as the Assistant Secretary? How is the covered facility informed of the decision? Does DHS provide detailed reasoning to the covered facility on how the decision was reached?

Response: Under the Chemical Facility Anti-Terrorism Standards (CFATS), 6 C.F.R. Part 27, an applicant submitting an Application for Review (e.g., a request for an adjudication) is required by 6 C.F.R. § 27.310(b)(6) to submit all legal memoranda, other documents, declarations, affidavits, and other evidence supporting the position asserted by the applicant. Next, the Assistant Secretary for Infrastructure Protection, through the Office of the General Counsel, is required by 6 C.F.R. § 27.310(c) to submit a written response, accompanied by legal memoranda, documents, declarations, affidavits, and other evidence supporting the Assistant Secretary's position. Pursuant to 6 C.F.R. § 27.330(a), the Presiding Officer then reviews the Application for Review, the Department's response, and all supporting filings to determine whether there is a genuine issue of material fact and, if not, whether one of the parties is entitled to a summary decision in its favor as a matter of law pursuant to 6 C.F.R. § 27.330(b).

If the Presiding Officer determines that there exist factual issues requiring cross-examination of witnesses or other proceedings at a hearing, the Presiding Officer is required to conduct a hearing in accordance with the procedures under 6 C.F.R. § 27.335.

Question#:	6
Topic:	section 27.315
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Following the hearing and oral argument, if any, and consideration of any post-hearing briefs submitted by the parties, the Presiding Officer shall issue an initial decision pursuant to 6 C.F.R. § 27.340(b). The initial decision is a written decision that fully explains how the Presiding Officer arrived at the decision.

The initial decision of the Presiding Officer constitutes final agency action if neither party appeals that initial decision in a timely manner. Under 6 C.F.R. § 27.345, either party may submit a Notice of Appeal of an Initial Decision to the Under Secretary for National Protection and Programs within seven days of the initial decision. After consideration of briefs filed by the appellant and the appellee, the Under Secretary issues a final decision on the appeal. The Under Secretary's final decision would also be issued in written form and constitutes final agency action.

Question#:	7
Topic:	attorneys
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: 27.315(a) states that the Assistant Secretary shall appoint attorneys to serve as Presiding Officer. What criteria or by what process are the Presiding Officers chosen? Is there a process in place whereby an adjudicator is chosen randomly or is the choice of Presiding Officer in the complete discretion of the Assistant Secretary? With respect to this provision, does the Assistant Secretary have the authority to appoint persons to the position of neutral adjudications officer who are not attorneys but who otherwise have expertise in the fields of engineering, business, security, chemistry or any other relevant field?

27.315(b) states that the Assistant Secretary may appoint "one or more attorneys...to serve generally in the capacity as Presiding Officer(s) for such matters". With respect to each Application for Review, how many adjudicating officers preside in a single case? Can there be more than one Presiding Officer? If more than one, is the decision made by majority vote or by unanimous decision?

Response: Pursuant to 6 C.F.R § 27.315(a), adjudication proceedings are presided over by a single Presiding Officer who must be an attorney employed by the Department.

Question#:	8
Topic:	non-attorney
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: To what extent do non-attorney experts in these fields otherwise participate in the adjudication process? Do they participate as witnesses? Do they advise the Presiding Officer in an official or informal capacity? Do they provide official testimony supporting the position of DHS in an adjudication? Does the covered facility have access to any such official testimony?

Response: The Department of Homeland Security (DHS) expects that non-attorney expert witnesses could be asked to provide relevant testimony by either DHS or the Applicant for Review in a Chemical Facility Anti-Terrorism Standards adjudication if the Presiding Officer decides that a material factual issue requires a hearing with witnesses. The calling of expert witnesses would be a matter for the parties and the Presiding Officer to decide. Both parties would have access to any expert witness testimony provided by the other party and would have an opportunity, pursuant to 6 C.F.R. § 27.335(b)(3), to conduct cross-examination. The Presiding Officer may be required to issue rulings concerning the admissibility of any expert testimony proposed to be offered. Expert advice to the Presiding Officer from any "interested person" (e.g., any party), or from any DHS official involved in any investigative or prosecutorial function related to the proceeding, outside of the adjudication process would be precluded by the prohibition under 6 C.F.R. § 27.320(a) against *ex parte* communications. If any other relevant expert advice (e.g., from a non-interested person) is provided to the Presiding Officer in an *ex parte* manner, a summary of that information must be made available to any parties who have not already had an opportunity to respond.

Question#:	9
Topic:	presiding officers
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: Are the Presiding Officers employees of DHS? If so, are they subject to the authority of the Assistant Secretary? What measures does DHS have in place to ensure that the individuals who serve as Presiding Officer(s) or in any adjudicatory capacity remain neutral and not unduly influenced by their status as employees of DHS generally and the Assistant Secretary specifically?

Response: Section 27.315 of the Chemical Facility Anti-Terrorism Standards (CFATS) requires that the Presiding Officer for a CFATS adjudication proceeding must be an attorney who is employed by the Department of Homeland Security (DHS) but who has not performed any investigative or prosecutorial functions with respect to CFATS. In addition, 6 C.F.R. § 27.320 specifies that Presiding Officers, and any persons who advise Presiding Officers, must not have any *ex parte* communications with any DHS official or representative of an official who performs a prosecutorial or investigative function related to the proceeding.

Question#:	10
Topic:	adversarial proceeding
Hearing:	Chemical Security: Assessing Progress and Charting a Path Forward
Primary:	The Honorable Lindsey O. Graham
Committee:	HOMELAND SECURITY (SENATE)

Question: Once a final decision has been made in an adversarial proceeding, what information is provided to the covered facility regarding the facts and reasoning behind how the decision was reached? Is there any further appeal allowed of a final DHS decision and, if yes, to what entity may that appeal be made?

Response: If the Assistant Secretary, a facility, or other person is dissatisfied with the Presiding Officer's initial decision under 6 C.F.R. § 27.340(b), the initial decision may be appealed to the Department of Homeland Security Under Secretary for National Protection and Programs pursuant to 6 C.F.R. § 27.345. Under 6 C.F.R. § 27.345(b)(2), an appellant must file a Notice of Appeal within seven calendar days of the service of the Presiding Officer's initial decision. If no such notice is filed within that time, the Presiding Officer's initial decision becomes the final agency action.

If a timely Notice of Appeal is filed, the appellant and appellee must then file and serve written briefs explaining their respective positions. After considering the briefs, the Under Secretary then issues a final decision pursuant to 6 C.F.R. § 27.345(f), which constitutes final agency action in that matter.
Both the initial decision issued by the Presiding Officer and any final decision issued by the Under Secretary will be issued in written form to explain fully how the Presiding Officer or Under Secretary arrived at the decision.

Any initial decision or final decision that constitutes final agency action may be subject to judicial review in an appropriate Federal court as provided by Sections 701-706 of the Administrative Procedure Act.

Post-Hearing Questions for the Record
Submitted to Darius D. Sivin, Ph.D.
From Senator Joseph I. Lieberman

"Chemical Security: Assessing Progress and Charting a Path Forward"
March 3, 2010

1. ***Critics of a requirement to consider inherently safer technology or IST allege that there is not sufficient agreement about what IST is to include this concept in chemical security legislation, or that it cannot be meaningfully quantified or compared. Do you agree? If not, why not?***

We disagree with the assertion that "there is not sufficient agreement about what IST is to include this concept in chemical security legislation, or that it cannot be meaningfully quantified or compared." Congress would probably not be able to protect the public from any grave danger if it were necessary to wait for total agreement[1]. Fortunately, the United States House of Representatives has already reached an agreement that does not require the words "inherently safer technology." The House has provided an adequate definition of what it wishes all tiered facilities to assess and what it wishes the highest risk facilities to implement. H.R. 2868 calls for "methods to reduce the consequences of a terrorist attack," defined as measures:

> used at a chemical facility that reduces or eliminates the potential consequences of a chemical facility terrorist incident, including—
>
> ''(A) the elimination or reduction in the amount of a substance of concern possessed or planned to be possessed by an owner or operator of a covered chemical facility through the use of alternate substances, formulations, or processes;
>
> ''(B) the modification of pressures, temperatures, or concentrations of a substance of concern; and
>
> ''(C) the reduction or elimination of onsite handling of a substance of concern through improvement of inventory control or chemical use efficiency.

If the Senate were to pass a bill with a similar definition, it would not be difficult to measure reduction of the consequences of a terrorist attack. Reduction can be measured using any consistent and accepted methodology by the number of people in the vulnerability zone who are potentially exposed to toxic gases that could be released by an attack. By this means, there will be no problem measuring or quantifying "methods to reduce the consequences of a terrorist attack."

Moreover, for most of the highest risk facilities, the methods that can be used to reduce the consequences of an attack have ample foundation in current industry practice. According to a recent report by the Center for American Progress[2]:

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[1] In *Doubt is their Product* (Oxford University Press, 2008), Michaels demonstrated that many potentially regulated parties deliberately introduce doubt into scientific debates as tactic to avoid regulation.

[2] Orum P and Rushing R. (2008) *Chemical Security 101: What You Don't Have Can't Leak, or Be Blown Up by Terrorists.* Washington DC: Center for American Progress.

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- Thirty bleach plants could remove danger to some 50 million Americans by generating chlorine on-site without rail shipment and bulk storage.

- Fifteen water utilities could remove danger to 17 million people by converting from chlorine gas (and sometimes sulfur dioxide gas) to alternatives that include liquid bleach or ultraviolet light.

- Eight petroleum refineries could remove danger to 11 million Americans by substituting toxic hydrofluoric acid, used in refining crude oil, with sulfuric acid (regenerated on-site if needed).

All of these technologies are currently in use in other facilities in the United States. The Department of Homeland Security (DHS) has determined that the substitutes described above including liquid bleach and sulfuric acid do not pose hazards of the nature that would require them to be on the Chemical Facility Anti-Terrorism Standards (CFATS) Appendix A list. There is substantial scientific agreement about the feasibility, utility and comparative reduction in the consequences of a terrorist attack resulting from the use of these technologies.

2. ***Do you believe the existing CFATS regulations are adequate to promote the use of inherently safer technologies in all or most cases where they would be beneficial and appropriate?***

It is true that the existing CFATS regulations contain a weak incentive for the use of methods to reduce the consequences of a terrorist attack. Namely, by reducing the size of its vulnerability zone, a facility can be put into a lower tier or get out of regulatory coverage entirely. However, behavioral economists tell us that people often default to inaction, even when taking action would be in their interest. Moreover, people often do not even pursue the information that would allow them to decide whether or not taking a certain action is in their interest[3]. In this case, the information required involves a structured assessment to determine the costs, and potential savings associated with current practices and alternatives. Without statutory and regulatory guidance, many businesses, especially smaller ones, will not even know how to pursue the information. In addition, although the consequences of a terrorist attack on a chemical facility may be high, the likelihood of an attack on any given facility may not be very large. It is difficult for markets to value such "low probability, high consequence" events. Hence in many cases, the weak incentives of CFATS are inadequate to overcome the tendency to inaction.

Unfortunately, facility owners and managers facilities do not harm only themselves when they fail to act in their own interest by using available alternatives. They place their employees and

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[3] Thaler RH and Sunstein CR. (2008) *Nudge: Improving Decisions about Health, Wealth, and Happiness.* New Haven: Yale University Press.

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residents of surrounding communities at risk. As a result, the facilities identified by the Center for American Progress and described in the answer to Question 1 above continue to put millions of people at risk, despite the fact similar facilities have implemented the methods described above. We believe it is necessary for the government to have the authority to act when facility owners and managers fail to do so. Legislation should require facilities in all four regulated tiers to assess the technical feasibility, costs, avoided costs (including liabilities), personnel implications, savings, and applicability of implementing methods to reduce the consequences of a terrorist attack. This will provide the mangers with the full information they need to evaluate whether it is in their interest to implement such methods. Moreover, for the highest risk facilities, those in tiers 1 and 2, there is such an overwhelming public interest in preventing the damage and loss of life that could result from an attack that the government should have the authority, on a case-by-case basis, to require implementation under conditions spelled out in H.R. 2868.

3. ***Do you agree with testimony that a requirement to consider and in some cases implement IST, such as that contained in H.R. 2868, would hurt the availability of needed pharmaceuticals, microelectronics or other specialized products?***

This claim is a red herring. It reflects a lack of serious engagement with this important public policy issue. It has been asserted that H.R. 2868 may negatively restrict the production of active pharmaceutical ingredients (APIs). This assertion is based on the fact that some of the key raw materials used in making APIs are included on DHS's Appendix A of covered chemicals. Opponents of H.R. 2868 have claimed that substituting chemicals or processes used for the production of APIs would likely violate the conditions of their FDA approvals. If so, it would be extremely easy for a manufacturer of APIs to comply with H.R. 2868. All that would have to be done is to submit an assessment showing that substitution would violate the conditions of FDA approval. Such substitution would not be feasible and H.R. 2868 would prohibit DHS from requiring implementation, period. Hence an elaborate scenario, presented at the hearing, in which pharmaceuticals would become unavailable or jobs moved abroad is entirely unrealistic. The availability of APIs would not be affected in the slightest if a bill similar to H.R. 2868 were to become law.

Another scenario was offered in which DHS makes hydrochloric acid "unavailable." A supplier to the microelectronics industry can no longer manufacture its largest product, resulting in at least a 50% reduction in workforce. Alternatives have to be developed requiring the investment of billions of dollars that small companies do not have. In this scenario, it is more than obvious that the "unavailability" of HCl would "significantly and demonstrably impair the ability of the owner or operator of the covered chemical facility to continue the business of the facility at its location." As a result, DHS would be prohibited by H.R. 2868 from making HCL "unavailable" to this manufacturer and the predicted disastrous consequences would not come about.

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March 3, 2010

A third scenario was offered in which a company's customers in the microelectronics industry require it to undergo specific certification standards as a product supplier. If the company were forced to substitute for hydrofluoric acid (HF), it would immediately be out of compliance with its customers' product standards. Such substitution would "significantly and demonstrably impair the ability of the owner or operator of the covered chemical facility to continue the business of the facility at its location." H.R. 2868 would prohibit DHS from requiring implementation, period. Hence there would be no negative effect on the microelectronics industry.

Since the plain language of the bill clearly prevents all of these scenarios, one wonders why they were even offered. Perhaps those who offer them simply don't want to be regulated, even in cases in which there is minimal impact to the business and overwhelming benefit to the public.

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